NATIONAL INSTITUTE OF SIDDHA

Chennai – 47

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI – 32

Pre clinical and clinical study on

SWASA KASAM

And

The drug of choice is Thuthuvalayathy Chooranam

(DISSERTATION SUBJECT)

For the partial fulfillment of the

Requirements to the Degree of

DOCTOR OF MEDICINE (SIDDHA)

BRANCH I– MARUTHUVAM

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INTRODUCTION

Siddha system is one of the ancient systems of medicine in our country. The word siddha come from the siddhi which means an object to attained such as perfection in life or eternal bliss.It not only deals with physical body of man but also with the sinner soul.

Siddhars are the forerunner of this system who are the divine persons attained siddhi and siddha system of medicine was inherited by them from lord siva. Siddha system of medicine doesn't consider treatment and prevention separately. The main aim of this system is prevention of disease as it is well said that

"Prevention is better than cure."

Siddha system based on five elements, 96 thathuvam and three life factors vatha, pitha and kapha. They are the three fundamental principles and essential factors in the composition of human body .In all tissue of the body they exist in different ratio.

The three life factor vatha, pitha, kaba, represent the five basic element or Bhuthas.

- Vatha consist of vali and vin (air and ether)
- Pitham consists of Thee (fire)
- Kaba consists of man and neer (earth and water)

They all persist in the body in subtle form. There appearance in the body is felt by their special characteristic features and their function in the body.

When these three life factors get deranged due to extrinsic and intrinsic factors like diet and habit they bring about disease peculiar to their influence.

"மிகினும் குறையினும் நோய் செய்யும் நூலோர்

வளி முதலா எண்ணிய மூன்று."

- திருக்குறள்.

Equating the five elements both in universal substances and the human body guides the physician in the choice of appropriate medicine suited to each case.

The five basic elements form the connecting like between the microcosm man and the macrocosm or the world through vatha, pitha and kabha. Hence the siddhar's statement

"What all persists in the universe persists in man

And what all persists in man persists in the universe"

Any changes in the universe due to naturals or unnatural causes will create changes in human system.

If the diet regimen is followed as per siddha principle of life it will not produce any harm to the harmonious functions of the three life factors no disease will occurs.

"மாறு பாடில்லா உண்டி மருத்துண்ணின்

ஊறுபாடு இல்லை உயிர்க்கு

- திருக்குறள்.

Here the right food habit helps the body to keep the life factors in good condition. Hence diet becomes medicine in the preventive aspects.

"உணவே மருந்து மருந்தே உணவு"

- திருமூலர்.

Since the disease occurs due to the derangement of three life factor siddhars have classified the disease accordingly .They classified as vatha disease 80, pitha disease 40, kapha disease 21.Swasakasam is one among the kapha disease.

As per Yugi Swasa kasam is a disease condition contributed by the following sign and symptoms such as severe cough with or without expectoration, Expiration is like a hiss of a serpent, frequent hemming, sense of heat in both nostrils, Hoarseness of voice, indigestion, flatulence which may be co-related to the disease condition "Bronchial Asthma" in modern science.

Bronchial asthma is a very common disease in the society due to increasing exposure to air pollution and western life style. It is common in both sex but more prevalent among boys, while during adolescence and adulthood, it affects girls and women more.

The prevalence of bronchial asthma has increased significantly since the 1970s. About 300 million people world wide have asthma and by 2025 it has been estimated that a further 100 million will be affected

In India, it is estimated that 57,000 deaths were attributed to Bronchial Asthma in 2004(WHO2400) and it was seen as one of the leading cause of morbidity and mortality in rural India (Smith 2000). In 2009 Bronchial asthma caused 250,000 deaths globally.

In order to specify the importance and prevention of this disease, GINA (Global Intiative for Asthma) sponsors **World Asthma Day** held each year on the **1st Tuesday** of month of **May** to create awareness and graded asthma severity as intermittent,mild,moderate and severe persistent based on the symptoms.

So there is a noticeable increase in health care burden for asthma in several area of the world to change in it epidermiology and symptoms. Since other system of medicine use long term of steroid drug for Bronchial Asthma it is need for hour to explore siddha drug formulations to avoid complication produced by steroid drug. So Author have intended to evaluate the efficacy of the Siddha formulation **Thuthuvalayathy chooranam for Swasakasam (Bronchial asthma).**

The ingredient of this drug said to possess expectorant, stimulant, carminative, antispasmodic action**,** immunomodulatary, bronchodailator, anti-oxidant, anti-inflammatory, anti-histamine actions and cost effective treatment. The above said drug formulation, has not undergone any clinical trial, so far. So, it is proposed to carry an open clinical trial to find out its efficacy in Swasa Kasam.

AIM AND OBJECTIVES

AIM :

To document the siddha drug **Thuthuvalayathy chooranam** in the treatment of **Swasa Kasam(Bronchial asthma)** by the standard process of evaluation of safety and efficacy of the drug.

OBJECTIVES:

1) **Primary Objectives:**

To evaluate the therapeutic efficacy of the siddha drug, **"Thuthuvalayathy chooranam" (Internal)** in the treatment of **"Swasa Kasam"**.

2) **Secondary objective**:

- To evaluate the safety profile (acute, long term toxicity studies) of the trial drug.
- To study the siddha cofactors towards the efficacy of medicine.

SIDDHA ASPECTS

OTHER NAMES (SYNONYMS):

As per Yuki Vaidhya Chinthamani Says,

- Isivu Irumal.
- Izhuppu Irumal.
- Swasa Irumal.

Eyal (definition):

Sever cough with or without expectoration, expiration is like a hiss of a serpent, frequent hemming and sense of heat in both nostrils, hoarseness of voice, indigestion and flatulence.

Noi Varum Vazhi (Etiology):

Yugi Vaidhya Chinthamani Says,

"வேகின்ற வதிகமாம் புகையி னாலும்
மீறுகின்ற பாணத்தால் மிக்குந்தானே"

"பாணத்தால் பரமாக்கினி மிகுக்கை யாலும்
பாரமா மாமிசங்கள் புசிக்கை யாலும்
தாணத்தாற் சஞ்சாரந் தவிர்க்கை யாலும்
சரிபடாப் பதார்த்தங்கள் புசித்த லாலும்
தீணத்தாற் புசியாம லிருக்கை யாலும்
சேயிழையார் மேலின்பஞ் சிதைவதாலும்
மாணத்தால் மாதுக்க மடைத தாலும்
மதத்தாலுஞ் சுவாசமது மருவுங் காணே".

- **யூகி சிந்தாமணி**

Diet and habits:

- Exposed to excessive smoke
- Excessive intake of cold water, food items
- Increased acidity
- Excessive intake of non-vegetarian diet
- Lack of Exercise
- Intake of allergy inducing food
- Starving on hunger
- Taking Improperly cooked food
- Excessive Mental Stress

“காணவே தேவதைக்குப் பிரித்த பண்டம்
களவாடித் தின்றாலுங் கணவன் றன்னைத்
தோணவே நிந்தையைச் சொல்லுவ தாலுஞ்
சுசியான பதார்த்தமெச்சில் பண்ணி னாலும்
வேணவே ஒருவர்செய்த நன்றி தன்னை
மிகமறந்து கொடுமைகடான் விளம்பு வோர்க்கும்
பேணவே சபைதனிலே சொன்ன பேச்சுப்
புரண்டோர்க்குங் காசமது பிறக்குந் தானே”

- **யூகி சிந்தாமணி**

Character and Behaviors

Mental stress due to:

- Stealing foods which were offered to GOD
- Cursing life partner
- Ingratitude
- Persons who don’t keep his words

Siddha Maruthuvam [Pothu] Says,

- இந்நோய் குளிர்காற்றிலீடுபடல்
- வெய்யிலில் மிகுதியும் அலைதல்
- மிக்க குளிர்ச்சியைத் தரும் பொருளையும்
- சூட்டைத் தரும் பொருளையும் உண்ணல்
- பெரிதும் உரத்துப் பேசுதல்
- மிக்க காரப்பொருள், நன்மணம், தீ மணம் ஆகியவற்றை முகர்வதாலும் பிறக்கும்.

CAUSES:

- Exposure to cold weather
- Over strain in hot climate
- In-taking of cold and hot foods
- Singing/speaking in high pitched voice
- Irritants caused by following dust, mud, lime etc...
- Inhalation of pleasant/irritable odor.

Madhava Nidhanam Ennum Roga Vrichayam say's

புகையினால் சுவாச மார்க்கம் அடைபடுதல், ஆமரசம் சுவாசாசயத்தில் சேருதல், அதிக வியாயாமம் ருசியான அன்னத்தைப் புசித்தல், விழுங்கும் போது உணவு அதன் பாதையை விட்டு வேறு வழியில் பிரவேசிப்பது, வேகங்களை அடக்குவது, அவ்விதமே தும்மலை அடக்குவது.

- Excessive Smoke
- Excessive gastric secretion and regurgitation
- Taking improperly cooked food
- Food enters into the larynx while swallowing
- Controlling reflexes like sneezing and Cough.

Thanvandri Vaidhyam say's

அரசரோ கந்தனக்கே யமைச்சராய் காசரோகம்

தரை மிசை மாந்தர் தம்மைச் சார்ந்திடும் வகையோ தன்னி

லுரமிசை சிலேசந் தங்கு முறுதுய ராலு மாதர்

தருமயலாலுந் தூமஞ் சார்துகள் முகர்ந்தாலும்

- Stress
- Excessive Coitus
- Inhalation of dusts, pollens etc.

Anubava Vaitheya Deva Ragaseyam Says,

வாத கபங்களின் விருத்தி, அசீரண பேதி, வாந்தி, விசப்பாண்டு, விடாச்சுரம், புகை, காற்று, தானியச்சுனை, அதிசீதளக்கபம், மர்ம தளங்களில் அடிபடுதல் முதலிய காரணங்களினால் உண்டாகும்.

- Elevation of vital humours such as Vatham and Kabam
- Diarrhea due to indigestion.
- Vomiting
- Anemia due to toxicity.
- Persistence fever
- Air pollution of dust, husk etc…
- Excessive Cold
- Trauma of vital organs.

Murkurigal (Preliminary Signs):

தொண்டை புண்பட்டது போல நோதல், பின் தொண்டை சிவத்தல், தொண்டயில் முள்ளால் குத்துவது போன்ற உணர்ச்சி ஏற்படல், குரலோசை குறைதல், மூக்கு நீர்பாய்தல், மார்பு நோதல், சூடுள்ள பொருள்களில் விருப்பம் முதலியன உண்டாகும்.

- Sore throat.
- Redness of throat.
- Pricking sensation in the throat.
- Low pitched voice.
- Running nose.
- Pain in the Chest.
- Aspiration of hot foods.

நோய் எண் (Classification):

Yugi Vadihya Chindamani says,

தானான காசமது பன்னிரெண் டாகுந்
தாக்கான மந்தார காசத் தோடு
பானான பக்கமந் தார காசம்
பாங்கான சுடர் காசம் வாத காசம்
பேனான பித்தமாங் காசத் தோடு
பேர்பெரிய **சுவாசகா ச**த்தோ டொக்க
ஏனான இரத்தமாங் காசத் தோடு
இரைப்பான சிலேத்மகா சந்தா னாமே.

ஆகின்ற பீனிசத்தின் சுவாச காசம்
அழிவாத பித்தத்தின் காச மாகும்
போகின்ற பித்தசிலேட்ம காசந் தானே
புகழ்பெரிய சொந்தமாங் காசத் தோடு
தேகின்ற காசமது பனிரெண் டாகுந்
தேளிவாக இதனுடைய செயலைக் கேளே!

Swasa kasam is one among the twelve types of Kasam.

The Twelve types are,

1. Mandhara Kasam.
2. Pakka Mandhara Kasam.
3. Sudar Kasam.
4. Vatha Kasam.
5. Pitha Kasam.
6. **Swasa Kasam.**
7. Ratha Kasam.
8. Silethuma Kasam.
9. Peenisa Kasam.
10. Vathapitha Kasam.
11. Pitha silethuma Kasam.
12. Thontha Kasam.

T.V.Sambasivam Pillai Dictionary says

There are twenty types of kasam,

1. **Swasa kasam**
2. Manthara kasam
3. Ratha kasam
4. Vadha kasam
5. Pitha kasam
6. Vali kasam
7. Silethuma kasam
8. Thontha kasam
9. Neela kasam
10. Bala kasam
11. Eelai kasam
12. Sudar kasam
13. Pakka kasam
14. Pakka manthara kasam
15. Pennisa kasam
16. Naadha kasam
17. Virana kasam
18. Karppa kasam
19. Adaippu kasam
20. Gunma kasam

Agasthiayar – 2000 Says,

There are eight types, those are,

1. Vatha Kasam
2. Pitha Kasam
3. Kaba Mandhara Kasam
4. Pakka Mandhara Kasam
5. Mandhara Kasam
6. Sudhika Kasam
7. Marundheedu Kasam
8. Kasam

Tamilaga Siddha Vaitheya Gurugulam Says,

There are twelve types. Those are,

1. Vatha Kasam
2. Pitha Kasam
3. Kaba Kasam
4. Vatha Kasam
5. Pitha Kaba Kasam

6. Thontha Kasam
7. **Swasa Kasam**
8. Mandhara Kasam
9. Patcha Mandhara Kasam
10. Ratha Kasam
11. Peenisa Kasam
12. Sudar Kasam

Vaidya sara sangraham classifies as

1. Manthara eraippu
2. **Swasa kasam**
3. Pachai udambi ledutha swasakasam

Jeeva Rakshamirtham Says,

There are five Types of Kasam, Those are,

1. Vatha Kasam
2. Pitha Kasam
3. Silethma Kasam
4. Ratha Kasam
5. Shaya Kasam

Raja Vaidhya Bodhini – Part I Says,

There are twelve types. Those are

1. Vatha Kasam
2. Pitha Kasam
3. Sethuma Kasam
4. Vatha Pitha Kasam
5. Pitha Sethuma Kasam
6. Mandhara Kasam

7. **Swasa Kasam**
8. Shaya Kasam
9. Sudar Kasam
10. Peenisa Kasam
11. Naadha Kasam
12. Thontha Kasam

Kuri Gunangal (Signs and Symptoms):

Siddha literatures described the signs and symptoms of Swasa kasam as follows,

Yugi Vaidhya Chinthamani Says,

"வண்மையாய் கோழை கட்டி இருமி வீழும்
மாநாகம் போலவே வாங்குஞ் சுவாசம்
திண்மையாச் செருமலுண்டா மடிக்க டிக்குச்
சீரண மிலாமலே வயிறு மூதும்
நண்மையாய் நாசியது தணல்போ லாகும்
நலிந்துடம்பு வற்றிவருங் குரலுங் கம்மும்
உண்மையா யுண்ணாக் கிலுாறுங் கேணி
யுழந்துமே சுவாசகா சத்தி னொப்பே."

Characteristic of swasa kasam According to Yugi Vaidhya Chinthamani sever cough with or without expectoration, expiration is like a hiss of a serpent, frequent hemming, sense of heat in both nostrils, emaciation, hoarseness of voice, indigestion, flatulence.

Raja Vaidhya bodhini – Part I says,

வாத நாடியும்,பித்த நாடியும் ஒருங்கு சேர்ந்து ஆமையைப் போல் மெல்ல ஊறி நடக்கில், வயிறு இரைச்சல், அன்னஞ் செரியாமை, கோழை கட்டல், இருமல், நாசிவரட்டல், குரற் கம்மல், முதுகெலும்பு எரிச்சல்,மேற்சுவாசம்.

The vatha and pitha pulsation is felt like the movement of tortoise, characteristics of Swasa kasam are flatulence, indigestion, mucoid sputum, cough, dryness of nose, low pitched voice, burning sensation along the vertebral column, dyspnoea.

Tamilaga Siddha Vaitheya Gurugulam Says,

அதிகமான கோழையுடன் இருமல், நாகப்பாம்பின் சீறலையொத்த சப்தத்துடன் சுவாசத்தில் சீற்றம், சீரணமின்மை, வயிற்றுப்பிசம், மூக்கில் அனலோடு வறட்சி, உடல் வற்றல், குரற்கம்மல், மூச்சு திணறல், உள்நாக்கில் வழவழப்பான நீருறல், அளவுக்கு மீறிய இழுப்பு, இசிவு.

Cough with expectoration of excess amount of sputum, breath sound like hissing of snake, indigestion, flatulence, dryness and heat sensation in the nose, emanciation, low pitched voice, dyspnoea, viscous secretion in Uvula, wheezing and Hysteria.

Uyir Kakkum Siddha Maruthuvam entra Athma Ratchamirtham Says,

உடல் உலர்ந்து வரும், சுரம், குளிர், இருமல், ஆயாசம், தலைவலி காணும். வயிறு பொருமி வாந்தி பண்ணும், மலம் கட்டி வியர்வை, தாகம் மிகும், புறந்தாள் அதைக்கும்.

Characteristics of Swasa kasam as per Uyir kakkum siddha maruthuvam as follows Dryness of the skin, fever, cough, fatigue, headache, vomiting due to indigestion, constipation with sweating, excessive thirst, pedal edema.

Mukkutra Verupadugal (Pathology):

In siddha system of medicine, the manifestation of all the diseases are due to dearrange ment of Doshas ie. Vatham, Pitham, Kabam. The Prime factor which is involved in Swasakasam is Kaba, which is accompanied with vitiated doshas Vatha or Pitha and produce clinical symptoms of disease Swasakasam.

This is clearly indicated by Theraiyar as,

“கபத்தினை யன்றி காச சுவாசம் காணாது” -**தேரையர்**

1. Excess of Kaba in the respiratory organs affects the Melnooku kal and uyir kal and so the vayu is not able to reach the terminal points of respiration which producing gasping and labored breathing.

2. Some authors say that the disease is caused by deranged Vatha. This thought is also acceptable because the destruction of Vayu in the respiratory tract is abnormally present.

3. Excessive intake of Pitha prompting diet induces Pitha Kutram. This type of Pitha produces more heat and this heat goes to head resulting in running nose, heaviness of head and neck, sneezing and also induces formation of water vapours in the lung and causing narrowing of air passage, which leads to the onset of the disease. This indicated as,

"பித்தமே மிகுந்தா லீளை
யிருமலும் பெலத்து நிற்கும்

- நோய் நாடல் நோய் முதல் நாடல். (Part-1)

The changes in the diet and deeds which elevates Vatha and Kaba produce the clinical symptoms of Swasa Kasam.

In Uyir Nilaigal, Anagatham (chest) which is the residence of Udhanan (melnokku kal) and Pranan (Uyir kal) is deranged.

When Pranan, the primary vayu is affected it lead to difficulty in breathing and involvement of Udhanan leads to cough and sneezing.

Involvement of Kirukaran leads to running nose, cough, sneezing. Involvement of Devathathan leads to tiredness. Involvement of Samanan causes inability to control the other Vayus and causes loss of appetite. Involvement of Sadhaga pitham leads to sluggishness. In Kaba, the derangement of Avalambagam leads to dyspnoea, cough, wheezing. In the seven Udal Thathus, Saaram, Senneer are affected which leads to lethargy and depression. In severe cases Oon and Kozhuppu are also affected leads to symptoms of emaciation and body pain.

Piniyari Muraimai (Diagnosis)

The way of diagnosis is very important by which a physician can deal the disease, by which he can rule out the cause of the disease which is the main thing to be treated.

Thiruvalluvar Said,

"நோய்நாடி நோய்முதல் நாடியது தணிக்கும்

வாய்நாடி வாய்ப்பச் செயல்"

-திருக்குறள்

Piniyari muraigal (Method of Diagnosis) is based upon three main principles,

1) Poriyal Arithal (Inspection).
2) Pulanal Arithal (Palpation).
3) Vinaathal (Interrogation).

1. Poriyal Arithal:

Porigal are the five organs of perception. They are Eyes, Ears, Nose, Tongue, Skin. Poriyal arithal is examining the Pori of the patient by the Pori of the physician. In **Swasa kasam**, it is as follows,

Mei (Skin)	:	Normal
Vai (Tongue)	:	Excessive Salivation
Kann (Eye)	:	Diminished vision
Mookkuu (Nose)	:	Running nose or nasalblock
Sevi (Ear)	:	Normal

2. Pulanal Arithal:

Pulangal are the five objects of senses.

Ooru (Tactile sensation)	:	Warmth
Oosai (Hearing)	:	Normal
Ozhi (Visual)	:	Normal
Suvai (Taste Sense)	:	Normal
Naatram (smell sense)	:	Altered or absent due to Runningnose and inflammation of nasal mucosa.

3. Vinadhal:

The influence factors such as Name, Age, Family history, Socio-economic status, occupation, History of allergies related to food, seasons, deeds, etc.

4. Kaalam (Age Distribution):

According to siddhar's the period of human life is totally 100 years. This is divided into three stages, as per to the domination of the three humours,

1. Vatha Kaalam - 1 to 33 years
2. Pitha Kaalam - 34 to 66 years
3. Kapha Kaalam - 67 to 100 years

Even though in each of these stages, the other humours are also involved a particular humour is dominating other two humours. According to this, **Kapha types of diseases** are more prone in the later stage (Kapha Kaalam)

5. Ivagai Nilangal (Geographical Distribution):

Study of Ivagai Nilangal is very important since geographical distribution plays a vital role in altering Mukkutram and produce disease which is peculiar to that area.

1. Kurinchi - Mountains range and its surroundings.
2. Mullai - Pastoral area of the forests and its surroundings.
3. Marudham - The fertile river bed and its surroundings.
4. Neidhal - The coastal region and its surroundings.
5. Paalai - Arid-Deserts and its surroundings.

Kurinchi:

"குறிஞ்சி வருநிலத்திற் கொற்றமுண்டி ரத்தம்
உறிஞ்சி வருசுரமு முண்டாம்-அறிஞரைக் அனை
கையமே தங்குதரத் தாமைவல்லை யுங்கதிக்கும்
ஐயமே தங்கு மறி."

-பதார்த்த குணசிந்தாமணி.

In Kurunchi Nilam, people are affected by fever that results in blood dyscariasis, disease of spleen and liver, and **prevalence of kaba disease** is more in Kurunchi nilam.

Mullai:

"முல்லை நிலத்த மைய முந்நிரை மேவினுமவ்
வெல்லை நிலைத்த பித்த மெய்துறுங்காண்-அல்லவெனின்
வாதமொழி யாததனுண் மன்னு மவைவழி நோய்ப்
பேதமொழி யாதறைப் பின்பு"

-பதார்த்த குண சிந்தாமணி.

In Mullai Nilam, the pastoral land of the forest is the birth place of many pitha diseases and diseases like abdominal colic and other vatha diseass also occur.

Marudham:

"மருதநில நன்னீர் வளமொன்றைக் கொண்டே
பொருதநில மாதியநோய் போக்குங்-கருநிலத்
தாறிரதஞ் சூழ வருந்துவரென் றாற்பிணியெல்
ஏறிரதஞ் சூழ்விக்கு மில்"

-பதார்த்த குண சிந்தாமணி.

Marudham the agricultural land is fertile with very good water which will drive out the diseases of all the three humors. The nourishing food with all the tastes never allows such diseases to occur.

Neidhal:

"நெய்தனில மேலுவர்ப்பை நீங்கா துறினுமது
வெய்தனில மேதங்கு வீடாகும்-நெய்தீன்
மருங்குடலை முக்காக்கி வல்லுறுப்பை வீக்கெளங்
கருங்குடலைக் கீழிறக்குங் காண்"

-பதார்த்த குண சிந்தாமணி.

Though Neithal Nilam has the dominant taste of Uvarppu (salt), it is the place of Pitha Vayu. The people who dwell here are susceptible to odema due to Kaba, Silapatha Rogam (Filariasis), Kudalanda Viruthi (Hernia).

Paalai:

"பாலை நிலம்போற் படரைப் பிற்ப்பிக்க
மேலைநில மீயாது விரித்தற்கு – வேலைநில
முப்பிணிக்கு மில்லாம் முறையே யவற்றாலாம்
எப்பிணிக்கு மில்லா மஃதெண்"

-பதார்த்த குண சிந்தாமணி.

The Palai Nilam is the birth place of all the disease caused by the derangement of Vatha, Pitha and Kapham. From Ivagai Nilangalwe understood that kapha disease is predominant in kurinchi Thinai.

6. PARUVA KAALAM (Season):

As the earth revolves around the sun, it gets sunlight at various positions. With reference to the position of the earth with the sun, year is divided into six seasons.

They are,

1. Karkaalam (Avani & Purattasi) : August 16 & October 15.
2. Koothirkaalam (Iyappasi & Karthigai) : October 16 & December 15.
3. Munpanikallam (Margazhi & Thai) : December 16 &February 15.
4. Pinpanikallam (Masi & Panguni) : February 16 & April 15.
5. Elavenilkaalam (Chithirai & Vaigasi) : April 16 & June 15.
6. Mudhuvenilkaalam (Aani & Aadi) : June 16 & August 15.

- According to siddha literature, all kapha diseases including **swasakasam** come during rainy season like Karkaalam. In Koothirkaalam also incidence of disease increased due to cold winds.
- Swasakasam mainly occurs due to vitiation of Kapham.
- Kapham thannilai sirappuram Kaalm – Karthigai to Masi.

"மூவரு மீறி முனிவு கொளாமல்
தத்தம் நிலையில் தன்னரசியலும்
காலவரைதனை கிளரக் கேண்மின்
ஆடியாதியாய் ஐப்பசி ஈராய்
ஆனிலமதஏகோ ராசியல் காலம்
மீன் முதலாளி வீறுகொள் மந்திரி
தேள் முதன் மாசி சேனாபதிக்கே"
(தேள் – கார்த்திகை)

- நோய் நாடல் நோய் முதல் நாடல்

- Hence the disease **Swaskasam** can occur from the later part of Koothir Kaalam to early part of Pinpani Kaalam, (i.e.,) from the last two weeks of October to the first two weeks of February.
- Totally the prevalence of disease is from August to February.

7. MUKKUTRA NILAIGAL:

VATHAM:

Pranan:

Pranan start from moolatharam and comes through the nostril and responsible for respiration in the ratio of 8:12.

In **Swasakasam**, this vayu is affected leading to difficulty in breathing.

Abanan:

It starts from swathittanam and descents down. It's responsible for excretion of urine and faeces. In **Swasakasam**, Abanan is affected resulting in Constipation.

Viyanan:

It arises from the shoulder and go through all the 72,000 nerves and responsible for movement of the body, appreciates the sense of touch; help to take the essence of the food to the strategic points the body and guards the body.

Samanan:

Samanan start from the umblicial cord and spread out upto the lower limbs and responsible for the balance of other four vadha and digestion. In **Swasakasam**, this vayu is affected since it cannot control the other vayus.

Udhanan:

It starts from umbilical region (udarakkini) and its main function is generation of speech and distributes the saaram equally to all tissues.

In **Swasakasam**, this vayu is affected resulting in low pitched voice due to difficulty of breathing.

Nagan:

It is responsible for higher intellectual function, hearing, thinking etc. It causes opening and closing of eye lids.

Koorman:

It start from mind and causes winking of the eyelids,yawing and closure of mouth.It gives strength and helps to visualize things and causes lacriminal secretion.

Kirugaran:

It lies in tongue and causes salivary and nasal secretion, sneeze reflex, cough reflex and increase the appetite, it makes to concentrate on one thing.

In **Swasakasam**, this vayu is affected and causing running nose, sneezing, excessive cough and loss of appetite.

Devathathan:

It either stays at the anus or at urinary orifice. Laziness, occular movement and human passions are attributed to this vayu.

In **Swasakasam**, this vayu is deranged causing emotional stress and insomnia.

Dhananjeyan:

It functions from the nose and it is responsible for the bloating of the body after death and also for the foul smell.After 3rd day of death it escapes through the head.

PITHAM:

Anal Pitham:

It lies between the stomach and the intestine .It causes digestion and dries up moist ingestion substances.

In **Swasakasam**, most of the patients complain loss of appetite and indigestion.

Ranjagam:

This fire lies in the stomach, where it helps in the absorption of food materials and finally it promotes the absorbed nutrients and gives red colour to the chyme and produces blood into the circulation.

Sadhagam:

It resides in the heart and executes the day to day activities according to the consciousness of the person. In **Swasakasam** disease, restlessness, breathlessness present.

Aalosagam:

It resides in both eyes and is responsible for clear vision.

Prasagam:

It resides in skin and gives complexion and brightness to skin.In **Swasakasam**, some patients may have allergic skin lesions.

KAPHAM:

Avalambagam:

It lies in lungs and helps in respiration. It controls the functioning of other four types of kapham and equillbrium as well as the heart. In **Swasakalam** patients, due to disarrangement of Avalambagam, will occur and causes tightness of chest, cough, wheezing and difficulty in breathing.

Kilethagam:

It resides in the stomach and moistures the food materials making them soft and thereby helps in digestion process. In **Swasakasam** disease, some patients have indigestion.

Pothagam:

Resides in the tongue and helps to realize the taste of the consuming food.

Tharpagam:

Sustaining in the head and gives refrigerant effect to cool the eyes and other sense organs.In some patients of **Swasakasam**, Tharpagam is affected resulting in Burning sensation.

Sandhigam:

It resides in the joint and helps in the free and easy movements of joints.

UDAL KATTUGAL

Saaram (Chyle):

It strengthens the body and mind. It is deranged in **Swasakasam** due to loss of appetite causing tiredness in the body and mind.

Senneer (Blood):

It is responsible for knowledge, strength, boldness and complexion in a person. In **Swasakasam** it is affected resulting in general weakness of the body.

Oon (Muscles):

It gives the shape to the body according to the of the physical activity and nourishment of bone growth

Enbu (Bone):

It forms the frame to the body and supports it to stand erect. It protects soft organs of the body and it also responsible for postures and movement of the body.

Kozhuppu (Adipose tissue):

It gives lubrication to the joint and other parts of the body to function smoothly.

Moolai(Bone marrow):

It resides the medulla of the bone and gives strength and softness to it.

Sukkilam / Suronitham (sperm or ovum):

It is responsible for reproduction.

4. ENN VAGAI THERVUGAL: (Eight diagnostic Tools):

It is the unique diagnostic tool in Siddha system of Medicine. The following lines reveal this as follows.

"நாடிஸ்பரிசம் நாநிறம் மொழிவிழி
மலம் மூத்திரமிவை மருத்துவ ராயுதம்"

-தேரையர்

And,

"மெய்க்குறி நிறந்தொனி விழி நாவிருமலம் கைக்குறி"

-தேரையர்

The diagnostic value of EN VAGAI THERVUGAL is specific to Siddha system of medicine and presumes the vitiated dhoshas in the patients.

Enn Vagai thervugal are,

a. Naa (Tongue).
b. Niram (Colour of the skin).
c. Mozhi (Speech).
d. Vizhi (Eye).
e. Malam (Motion).
f. Moothiram (urine).
g. Sparisam (Palpation).
h. Naadi (Pulse).

Naa:

It is observed for its color, presence of ulcer, coating, etc.

Niram:

Color of the skin, conjunctive.In **Swasakasam,** Niram is affected when the patient suffer from allergic skin lesions and anaemia etc.

Mozhi:

In **Swasa kasam** mode of speech may be emotional or difficulty in speech, low pitched voice, wheezing sound is heard.

Vizhi:

In **Swasa kasam**, the eyes may have itching and burning sensation

Malam:

Consistency hard or semisolid or diarrhea, undigested food, fluid resembling the water used to clean meat, color, frothy, dysentery, bloody, pus, mucous, smell, frequency of defecation, constipation, reduced or increased stool content, lower abdominal pain during defecation are noted.

Siruneer:

Colour – yellow, black, white copper colored, mixed color, color of fumes, Smell – smell of fire, honey, sweet odours, fragrance of flowers, fruity odour of deer flesh, frothy or not, frequency and quantity are noted.

Sparisam:

By Sparisam, the present of temperature and tenderness can be observed.

Naadi:

Naadi is the very important tool for diagnosis and prognosis of the disease.

In Noi Naadal Noi Mudhal Naadal Text,

Naadi is defind as,

"உடலில் உயிர் தரித்திருப்பதற்குக் காரணமான சீவசக்தி

எதுவோ அதுவே தாது அல்லது நாடி எனப்படும்"

Genesis of Naadi:

"கரிமுகனடியை வாழ்த்திக் கைதனில் நாடிபார்க்கில்

பெருவிரலங்குலத்தில் பிடித்தடி நடுவே தொட்டால்

ஒரு விரலோடில் வாதமுயர் நடுவிரலிற் பித்தம்

திருவிரல் மூன்றிலோடில் சேத்தும நாடிதானே"

- அகத்தியர் நாடி

Naadi is responsible for existence of life and can be felt one inch proximal to the wrist on radial side by means of palpitations with the tips of index, middle and ring fingers corresponding vatham, pitham, kapham respectively.

The three humors vatham, pitham and kabam exisits in the ratio 1: ½: ¼ normally. Derangement in these ratios leads to various disease entities.

The three Uyir Thathukkal are formed by the combination of three Naadi and three Vayus.

Idakalai + Abanan = Vatham

Pinkalai + Pranan = Pitham

Suzhumunai + Samanan = Kabam

Naadi Nadai in Swasa kasam:

Vatha Kapha Naadi:

“பாங்கான வாதத்தில் சேத்தும நாடிப்
பரிசித்தால் திமிர் மேவு முளைச்சலாகும்
தீங்கான இருமலுடன் சந்நி தோடம்
சேர்ந்த விடம் வெடிசூலை யிருத்ரோகம்
வாங்காத ஈளை மந்தார காசம்
வலியுடனே புறவீச்சுயுள் வீச்சு வீக்கம்
ஓங்காணுஞ்சுர முடனே **சுவாச காசம்**
உண்டாகும் வெகு நோய்க்கு முறுதிதானே.

- சதக நாடி.

Iya Naadi:

“தானமுள்ள சேத்து மந்தானிளகில் வெப்பு
சயமீளை யிருமல் மந்தார காசம்
ஈனமுறுஞ் சந்நிவிட தோடம் விக்கல்
யிருத்ரோகங் கரப்பான் விரண தோடம்
மானனையீர் சூலைதிரள் வியாதி வீக்கம்
வருஞ்சக்தி **சுவாச** நெஞ்சடைப்பு தூக்கம்
ஏனமுறுங் காமாலை பாண்டு சோபை
ஏழுசுரங்கள் பலதுக்கம் விடமுண்டாமே”

- சதக நாடி.

Kaba Pitha Naadi:

"இடமான சேத்துமத்தில் பித்த நாடி
எழுந்தணுகில் விடமுடனே வீக்கமுண்டாம்
திடமான குளிர் காய்ச்சல் மஞ்சள் நோவுந்
தேகத்தி லுளைச்சலிளைப் பிருமல் வாந்தி
விடமான நெஞ்சடைப்பு **சுவாசம்** விக்கல்
வெகு சுரமும் நாவறட்சி பாண்டுரோகம்
அடமான குவளைரத்த மதிசாரந்தான்
அணுகி வெகுபல நோய்க்குந் தடங்கண்டாயே "

- சதக நாடி.

Iya Ushnam:

" கதிப்பான சேத்துமத்திலுட்டிணங் கூடில்
கலந்தகுணஞ் சயமிருமல் **சுவாசகாசம்**
மதிப்பான கோழைரத்தம் விப்புருதியுடனே
வளர்நாசி காபீடமிருத் ரோகங்
கொதிப்பான சிங்கூவையாக் கிராண வாயு
கொட்டாவி விக்கல்மந் தார காசம்
துதிப்பான வீரலத்திக் காய்வு ரத்தம்
தோன்றுமிகு பிணிபலவுந் தொந்திப் பாமே "

- சதக நாடி.

Iya Vayu:

"தொந்தித்த சேத்துமத்தில் வாயுகூடித் தொடர்ந்த
குன்மம் நெஞ்சடைப்பு **சுவாசகாசம்**
வந்தித்த குரல்தனிலே உறுத்த லீளை
வழுவழுப்பு நீருறல் மலத்தி சீதம்
வெந்தித்தல் கொழுத்தல் குத்துந் திமிர்வியாதி
வீச்சுடனே வலியெட்டுந் திரட்சி பாண்ட
அந்தித்த கிறுகிறுப்பு மயக்கம் விக்கல்
ஆனபல பிணிகளுமே வந்தடருந் தானே"

- சதக நாடி.

Hence the Naadi Nadai in swasa kasam is Kapha, Vatha Kapha, Kapha Pitha, Iya Ushna, increased kapha and Iya Vayu.

Nei Kuri :

Neikuri is a prognostic tool in Siddha system of Medicine. For this examination first urine is collected in the early morning in a clear wide mouthed glass dish or China clay container and is subjected to analysis of "Neerkkuri and Neikkuri" within one and a half an hour.

Prior to the day of urine examination the patient is instructed to take a balanced diet and quantities of food must be proportionate to his routine intake. As per theraiyar Neerkkuri and Neikkuri nool:

"அருந்துமாறி ரதமும் அவிரோதமதாய்
அஃகல் அலர்தல் அகாலவூன் தவிர்ந்தழற்
குற்றளவருந்தி உறங்கி வைகறை
ஆடிக்கலசத் தாவியே காது பெய்
தொருமுகூர்த்தக் கலைக்குட்படு நீரின்
நிறக்குறி நெய்க்குறி நிருமித்தல் கடனே"

"நிறக்குறிக் குரைத்த நிருமாண நீரிற்
சிறக்க வெண்ணெய்யோர் சிறுதுளி நடுவிடுத்
தென்றுறத் திறந்தொலி யேகாதமைத்ததி
னின்றதிவலை போம் நெறிவிழியறிவும்
சென்றது புகலுஞ் செய்தியை யுணரே"

After collecting the urine in a wide cleaned glass bowel a drop of gingelly oil is dropped into it which is kept under sunlight in a calm place. The derangement of the three dhoshas can be diagnosed by the mode of spread of gingelly oil on the urine surface.

"அரவென நீண்டின் அஃதே வாதம்"

"ஆழிபோற் பரவின் அஃதே பித்தம்

முத்தொத்து நிற்கின் மொழிவதென் கபமே",

- If oil spreading like a **snake** indicates derangement of **Vatham**.
- If oil spreading like a **ring** indicates derangement of **Pitham**
- If oil spreading like a **pearl** indicates derangement of **Kapham**

"அரவிலாழியல் ஆழியில் அரவும்
அரவில் முத்தும் ஆழியில் முத்தும்
தோற்றில் தொந்த தோடங்களாமே"

.

When oil spreads like snake and ring, ring and snake, snake and pearl, ring and pearl indicates Dhondha Dhosham. (Dhondham – Combination of two)

DIFFERENTIAL DIAGNOSIS

NOI KANIPPUVIVATHAM are,

Silethuma Vatha Suronitham:

"பண்பாக வுடல்குளிர்ந்து வயிறு வீங்கிப்
பதைப்பான விடந்திட்டாற் போல் நோவாந்
திண்பான சிரசு நெற்றி நோக்கா டுண்டாஞ்
சிலேட்டுமமாய்க் கோழையோடு சுவாசமாகும்
மண்பாக மயக்கமொடு கனவு முண்டாம்
வாய்வரண்ட ருசியில்லா வருத்த மாகும்
நண்பாக நாடியுமே பட படக்கும்
நற்சிலேட்ம சுரோணிதமாம் நாடுங் காலே"

- யூகி வைத்திய சிந்தாமணி

In Silethuma Vatha Suronitham symtomps like chillness of body, abdominal distention with tenderness in abdomen, body pain, headache, expectoration, dyspnoea, fainting, dreaming, decreased salivation, loss of taste, rapid pulse etc.,
In **Swasakasam**, there is no abdominal distention and decreased salivation.

Swasa Pitham:

“கருத்தாக சுவாசமது மிகவுண்டாகுங்
கனமாக வயிறுமே ஊதிக் காணும்
உருத்தாக உடலதுதான் மிகவ லிக்கு
மூறுமே கேணி போல் வாய்நீர் தானும்
மருத்தாக மயங்கியே கண்ம றைக்கும்
மார்பிலே வலியோடு இரும லுண்டாந்
துருத்தாக வயிறதனின் பசியோ வில்லை
சுவாசமாம் பித்ததின் கூட்சந் தானே”

- யூகி வைத்திய சிந்தாமணி

In Swasa Pitham, there is increased breathing (tachypnoea), flatulence, pain all over the body, excessive salivation, loss of consciousness, pain in the chest followed by cough, loss of appetite etc., In **Swasa kasam** there is no loss of consciousness and pain in the chest followed by cough.

Swasa Silethumam:

“திறமையாய் நெஞ்சுதனிற் கோழை கட்டுஞ்
சிக்கென்று தானிருமி மூக்க டைக்குங்
குறுமையாய் குறட்டென்று சுவாசங் காணுங்
குளிரோடு சுரமுண்டாய் மயக்க மாகும்
மறமையாய் மார்போடு நெஞ்ச டைக்கும்
வாய்வறண்டு மூக்கதனில் நீரே பாயும்
வெருமையாய் மிகத்தண்ணீர் தாப முண்டாய்
விடுசுவாச சிலேட்டுமத்தின் விவரந் தானே”

-யூகிவைத்திய சிந்தாமணி

In Swasa Silethumam, there is accumulation of phlegm in the chest, cough, nasal block, difficulty in breathing, fever with rigor, syncope, tightness of chest, dryness of mouth, running nose, excessive thirst etc., In **Swasa kasam**, there is no fever with rigor, excessive thirst etc.

Mandhara Kasam:

"தானான தூயதோர் நாசி தன்னில்
சவநோய் நீர்தான் விழுந்த தும்மலுண்டாம்
மானான மார்புநெஞ் சடைத்து மூச்சு
வலுவாக பாம்புபோல் சீற லாகும்
கானான கண்டமோடு முகமுங் காதும்
காயமதுங் கசிவாகி வியர்வை யாகும்
ஏனான இருமலோடு கோழை கம்மல்
இரைப் பாகு மந்தாரகாச மாம

- யூகி வைத்திய சிந்தாமணி

In Mandhara kasam there is running nose, sneezing, chest tightness, breath sound is like hissing of snake, excessive sweating present all over the body, cough with expectoration, hoarsness of voice , breathing difficulty etc.

In **Swasa kasam** there is no sweating present all over the body.

Kandakiragam:

“வகையான குரலதனைப் பற்றி நொந்து
மார்போடு பிடரியினில் வலி யுண்டாகி
நுகரான சரீரமெல்லாம் நொந்த ழாற்றி
நுணுக்கமாய்ச் சுவாசமது புறப் படாமல்
முகையான நாவாலே மூச்சு மாறி
முகத்திலே வியர்வாகி விலாநோ வுண்டாம்
புகையான வன்னத்தைப் பருகொட் டாது
பரியகண்ட கிரகத்தின் பண்பு தானே”

- யூகி வைத்திய சிந்தாமணி

In kandakiragam, there is difficulty in speech, pain in the chest and occipital region, pain all over the body, breathlessness, oral breathing, sweating in face, pain in the ribs and loss of appetie. In **swasakasam**, there is no pain in the occipital region.

LINE OF TREATMENT:

In siddha system of medicine siddhar's follow different line of treatment for different disease. The line of treatment of Swasakasam consists of the following.

1. Kalichal Maruthuvam – To bring the dhoshas in equilibirium.
2. Internal Medicine – Mainly anti-spasmodic, expectorant to relieve the spasm respiratory system and to expel the sputum.
3. Diet –To maintain tri-dhoshas and energy in equilibrium.
4. Prevention methods –To strengthen the muscles of respiration (Pranayamam)
5. Yoga therapy – To maintain dhasa vayukkal and to improve mental and physical health.

Kalichal Maruthuvam (Purgation):

Patients are given laxative medicine **Mantha Ennai** at the dose of 8ml with warm water at the early morning, in empty stomach.

Ref: Siddha pharmacopoeia of Indian medicine.

Administration of Internal medicine:

For the treatment of the disease swasa kasam, **Thuthuvalayathi chooranam**- 1.5gm with honey twice a daily was given after meals.

Dietary advice:

"கத்தரி பேய்புடல் வரை யிருபாகல் பருங்காளா கண்டகாரி
அத்திக் காய்களும் வருக்கைமாபயற்றை கரையால் பீர்க்கரும்பிஞ்சுவேர்
மொய்த்தசூ ரணங்கதலித் தண்டோடப்பூ முள்ளங்கி முருக்கரும்பு
மத்திபூ சணிக்கா யீருள்ளிவள்ளி யுங்கபத் தோர்க் காகுமாமே"

- **பதார்த்த குண சிந்தாமணி**

"வேளை மணித்தக்காளி மென்சீதை சக்கரவர்த்தி
பீளை வசலைசுக்கு பெண்சுணங்கன் – வேளையிவை
செந்தளிர்க ளைக்கீரை செய்வர்கப தேகர்நிதம்
வந்தளி யுணத்தான் மகிழ்ந்து"

- **பதார்த்த குண சிந்தாமணி**

Vegetables to be added

- கத்தரி (Solanum melongena Linn**)**
- பேய்புடல் (Trichosanthes cucumerina.Linn)
- அவரை (Dolichos lab-lab. Linn)
- கண்டங்கத்தரி (Solanum xanthocarpum. Barm.f)
- அத்தி (Ficus glomavata. Linn)
- பீர்க்கு (Luffa acutaugula. (Linn),Roxb)
- மாவடு (Mangifera indica. Linn)
- வாழைக்காய் (Musa paradisica. Linn)
- முருங்கை (Moringa tinctoria.Lam)
- சுண்டை (Solanum torvum. Swartx)

Tuber to be added:

- முள்ளங்கி (Raphanus sativus. Linn)
- ஈருள்ளி (Allium sativum, Allium cepa. Linn)
- இஞ்சி (Zingiber officinale. Rose)
- கருணைத்தண்டு (Amorphophallus companulatus.Dennst)
- Onion contains ‘quercetin’, an anti-inflammatory compound and considered as most effective remedy for asthma.

Greens to be added

- மணத்தக்காளி (Solanum nigrum.Linn)
- கரிசாலை (Eclipta alba. Linn)
- பீளை (Aerva lanata. Linn)
- வசலை (Bascella alba. Linn)
- சிறுகீரை(Amaranthus gangeticus. Linn)
- மணலிக்கீரை (Gisekia pharmacoides. Linn)
- பரட்டைக்கீரை (Justicia madurensis. Chois)
- புளியாரைக்கீரை (Oxalis corniculata. Linn)
- Green leafy vegetable, fresh fruits and herbs are quite effective for asthma due to its antioxidant features.

Swasakasam patient can have food as follows:

- Steamed food like idly,idiyappam,puttu.
- Mussumusukai adai,kalyanam murungai ada.
- Turmeric and Pepper mixed milk.
- Ginger,suku mixed coffe.
- Crap soup,veg.soup, Pepper rasam,mutton leg soup.
- Thuthuvalai ,manathakali thuvayal.
- Apple daily since flavonoids of apples reduce inflammation.

Diet Restriction:

"கடுகு நற்றிலத் தெண்ணெய் கூழ்பாண்டங் கடலை
வடுவ தாகிய தெங்குமா வருக்கை நற்காய
மழவி லாதவெள் ளுள்ளிகொள் புகையிலை மதுபெண்
இடறு பாகவோ டகத்தி நீக்கிடலிச் சாபத்தியம்"

- தேரையர் வெண்பா

- Mustard seeds
- Bengal gram
- Mango
- Garlic
- Tobacco
- Bitter guard
- Asafotida
- Gingelly oil
- Coconut
- Jack fruit
- Horse gram
- Alcohol
- Sesban
- Avoid over indulgence in sex.

These are general diet and habitual restrictions for all diseases.

Swasa kasam patients should restrict the following also.

- Cool drinks, chocolate, cake.
- Curd, ghee, butter, cheese.
- Sweets, sour food.
- Tuberous food.
- Allergen food.
- Fish, dry-fish, chicken, beaf.
- Vegetables like cucumber, snake guard etc.

Prevention:

To educate the patients to prevent swasakasam

- Avoid smoking, alcoholism, tobacco.
- Avoid exposure to chill and cold weather
- Avoid working in dust, cement, cotton mills and in husks etc.,
- Have dinner before 7'o clock.
- Avoid full stomach at night
- Intake of hot water and hot food
- Advised to practice Pranayamam.
- Advise to sleep in phoenix mat etc,

"சிற்றீச்சுப் பாயிற் றினமும் படுப்பவருக்

குற்றிடுமே காந்த லுடம்புவருஞ் – சுற்றியதோர்

வாயுவறும் பித்தமறு மற்றுங் கபந்தீருந்

தாயகமா மிக்குணத்தைச் சாற்று"

- அகத்தியர் குணவாகடம்

PRANAYAMAM (Breathing Exercise):

Pranayama is control of Breath". "Prana" is Breath or vital energy in the body. On subtle levels prana represents the pranic energy responsible for life or life force, and "ayama" means control. So Pranayama is "Control of Breath". One can control the rhythms of pranic energy with pranayama and achieve healthy body and mind.

Pranayamam or breathing exercise mainly consists of Pooragam (inhalation of air by deep inspiration), Kumbagam (holding the breath as far as possible) and Resagam (exhalation of air by expiration)

During breathing exercise, the lungs filled with fresh air in its anatomical dead space also and expand well and get proper supply of oxygen by proper expansion of chest. So, pranayama practice is one of the prevention for Swasa kasam.

By this exercise, the duration of Kumbagam is increased. These result in proper gaseous exchange which provides increased oxygen supply to the lung tissues and purges the lungs of residual carbon dioxide. Since body organs gets more oxygen and toxins are removed from the body.

By the regular practice of Pranayamam, one can get rid of mental and physical stress. It provides increases mindfulness, Generates internal heat, appetite, strength, improves and provides vitality. It strengths immune system and prevent Hereditary disorder.

“ நாளொன்றுக்கு இருபத்தோராயிரத்து அறுநூறு

நலமான சுவாசந்தானே ழுந்திருக்கும்

கோளொன்றிப் பதினாலாயிரத்து நானூறு

குவிந்த மூலாதாரத்துள் ளொடுங்கும்

பாளொன்றி யேழாயிரத்திருநூறு சுவாசம்

பாழினிற் பாய்ந்திடுமென் றறிகப்பின்னை

ஏளொன்றி யிதனையே யுட்சாதித்தால்

எப்பொழுதும் பாலரா யிருக்கலாமே”

YOGA THERAPY

Yoga is a system inclusive of physical and mental training that can benefit people of all ages. It involves Asanas (body postures) and Pranayama (art of breath control), among which of its physical uses are to reduce stress-related conditions, help with circulatory and respiratory disorders such as Asthma, Bronchitis and improve over-allhealth. Asanas strengthen the muscles of respiration and diaphragm as well as regulate respiration. So, practicing asanas is more helpful in asthmatic patients as supportive therapies. The following asanas are helpful in Bronchial asthma.

- **SIRSASANAM (the head stand pose):**

  The lungs gain the power to resist any situation and stand up to any work, which may relieves one from cough, tonsillitis and asthma.

- **SARVANGASANAM (shoulder stand pose) :**

  Sarvangasana improves respiration and helps in treating bronchial asthma.

- **UTTHANASANAM (the squat and rise pose):**

  Utthanasana helps to empty impurity from lungs and gives the feeling of supercharges of energy.

- **PASCHIMOTTANASANAM (the fierce or powerful pose):**

  Paschimottanasna improves the efficiency of spinal nerves and has beneficial repercussions throughout the body.

- **BHUJANGASANAM (the cobra pose):**

  Bhujangasana expands the chest more than usual, thus helps to improve breathing and lungs capacity.

- **SALABHASANAM (the locusts pose):**

  Salabhasana improves the functions of lungs.

- **UTTAN PADASANAM(the raised foot pose) :**

  Uttanpadasana gives full expansion to the chest wall and keep the bronchi3qal healthy.

- **ARDHA MATSYENDRASANAM (the half spinal twist pose):**

  It is one of the important asana for proper functioning of lungs thereby helps in controlling Aeeesx v

MODERN ASPECTS

ANATOMY & PHYSIOLOGY OF RESPIRATORY SYSTEM

The respiratory system brings air in close relationship with the mixed venous blood enabling tissue respiration by uptake of oxygen into the circulation and elimination of carbon dioxide. The principal organs of the respiratory system are

- Nose,
- Pharynx,
- Larynx,
- Trachea,
- Bronchi
- Lungs.

The conducting division of the respiratory system consists of those passages that serve for airflow, mainly from the nostrils through the bronchioles.

The airway from the nose through the larynx is often called the **upper respiratory tract**.

The regions from the trachea through the lungs compose the **lower respiratory tract**.

Muscles of respiration - the inter costal muscles and the diaphragm

THE NOSE AND NASAL CAVITY

The nose is the external protuberance of an internal space, the nasal cavity. It is subdivided into a left and right canal by a thin medial cartilaginous and bony wall, the nasal septum. Each canal opens to the face by a nostril and into the pharynx by the choana. The floor of the nasal cavity is formed by the palate, which also forms the roof of the oral cavity. The complex shape of the nasal cavity is due to projections of bony ridges, the superior, middle, and inferior turbinate bones (or conchae), from the lateral wall. The passageways thus formed below each ridge are called the superior, middle, and inferior nasal meatuses.

On each side, the intranasal space communicates with a series of neighbouring air-filled cavities within the skull (the paranasal sinuses) and also, via the nasolacrimal duct, with the lacrimal apparatus in the corner of the eye. The duct drains the lacrimal fluid into the nasal cavity. The sinuses are located in four different skull bones - they are the maxillary sinus, which is the largest cavity; the frontal sinus; the ethmoid sinuses; and the sphenoid sinus, which is located in the upper posterior wall of the nasal cavity.

The sinuses have two principal functions: because they are filled with air, they help keep the weight of the skull within reasonable limits, and they serve as resonance chambers for the human voice.

The nasal cavity with its adjacent spaces is lined by a respiratory mucosa. Typically, the mucosa of the nose contains mucus-secreting glands and venous plexuses; its top cell layer, it consists principally of two cell types, ciliated and secreting cells. Two regions of the nasal cavity have a different lining. The vestibule, at the entrance of the nose, is lined by skin that bears short thick hairs called vibrissae. In the roof of the nose, the olfactory organ with its sensory epithelium checks the quality of the inspired air. About two dozen olfactory nerves convey the sensation of smell from the olfactory cells through the bony roof of the nasal cavity to the central nervous system.

Function of nose

This structural design reflects the particular ancillary functions of the nose and of the upper airways in general with respect to respiration. They clean, moisten, and warm the inspired air, preparing it for intimate contact with the delicate tissues of the gas-exchange area. During expiration through the nose, the air is dried and cooled, a process that saves water and energy.

PHARYNX:

Pharynx is the passage extending from the base of skull to the level of 6^{th} cervical vertebra where it is continuous with the oesophagus. It is 13 cm length, 35 cm width. The pharynx can be divided into three floors.

The upper floor- the nasopharynx:

It is primarily a passageway for air and secretions from the nose to the oral pharynx. It is also connected to the tympanic cavity of the middle ear through the auditory tubes that open on both lateral walls. The act of swallowing opens briefly the normally collapsed auditory tubes and allows the middle ears to be aerated and pressure differences to be equalized. In the posterior wall of the nasopharynx is located a lymphatic organ, the pharyngeal tonsil. When it is enlarged it may interfere with nasal respiration and alter the resonance pattern of the voice.

The middle floor -oral pharynx or oropharynx:

The middle floor of the pharynx connects anteriorly to the mouth and is therefore called the oral pharynx or oropharynx. It is delimited from the nasopharynx by the soft palate, which roofs the posterior part of the oral cavity.

The lower floor- hypopharynx

The lower floor of the pharynx is called the hypopharynx. Its anterior wall is formed by the posterior part of the tongue. Lying directly above the larynx, it represents the site where the pathways of air and food cross each other

Functions:

Passage of air and food, warming and humidifying of air, taste, hearing protection.

LARYNX:

The larynx is the voice box extends from the root of the tongue at the inlet of the larynx to the commencement of the trachea at the level of the 6^{th} cervical vertebra.It is 4.3 cm length.

The larynx is an organ of complex structure that serves a dual function: as an air canal to the lungs and a controller of its access, and as the organ of phonation.

Sound is produced by forcing air through a sagittal slit formed by the vocal cords and the glottis.

The laryngeal skeleton consists of almost a dozen pieces of cartilage, most of them very small, interconnected by ligaments and membranes.

Thyroid Cartilage -The largest cartilage of the larynx.

The arytenoid cartilages - A pair of small pyramidal pieces of cartilage,

The cricoid-another large cartilaginous piece of the laryngeal skeleton, has a signet-ring shape.

The arytenoid cartilages articulate with the cricoid plate and hence are able to rotate and slide to close and open the glottis.

The vocal ligaments are part of a tube, resembling an organ pipe, made of elastic tissue.

Functions

- Production of sound, speech occurs during expiration when the sound produced by the vocal cords in manipulated by the tongue, cheeks and lips.
- Protection of lower respiratory tract from the swallowed food from mouth. It is the passage for air between pharynx and trachea.
- Humidifying, filtering and warming continue as the air travels through the larynx.

TRACHEA

Below the larynx lies the trachea, a tube about 10 to 12 centimetres long and two centimetres wide. Its wall is stiffened by 16 to 20 characteristic horseshoe-shaped, incomplete cartilage rings that open toward the back and are embedded in a dense connective tissue.

The dorsal wall contains a strong layer of transverse smooth muscle fibres that spans the gap of the cartilage. The interior of the trachea is lined by the typical respiratory epithelium. The mucosal layer contains mucous glands.

At its lower end, the trachea divides in an inverted Y into the two stem bronchi, one each for the left and right lung. The right main bronchus has a larger diameter, is oriented more vertically, and is shorter than the left main bronchus.

The practical consequence of this arrangement is that foreign bodies passing beyond the larynx will usually slip into the right lung. The structure of the stem bronchi closely matches that of the trachea.

STRUCTURAL DESIGN OF THE AIRWAY TREE:

The hierarchy of the dividing airways, and partly also of the blood vessels penetrating the lung, largely determines the internal lung structure.

Functionally the intrapulmonary airway system can be subdivided into three zones:

- Proximal- purely conducting zone,
- Peripheral- purely gas-exchanging zone
- Transitional zone- in between

Morphologically it is relatively thick-walled, purely air-conducting tubes from those branches of the airway tree structurally designed to permit gas exchange.

The branching of airway is according to the rules of irregular dichotomy. The conducting airways comprise the trachea, the two stem bronchi, the bronchi, and the bronchioles. Their function is to further warm, moisten, and clean the inspired air and distribute it to the gas-exchanging zone of the lung. They are lined by the typical respiratory epithelium with ciliated cells and numerous interspersed mucus-secreting goblet cells.

The last purely conductive airway generations in the lung are the terminal bronchioles. Distally, the airway structure is greatly altered by the appearance of cuplike outpouchings from the walls. These form minute air chambers and represent the first gas-exchanging alveoli on the airway path. In the alveoli, the respiratory epithelium gives way to a very flat lining layer that permits the formation of a thin air–blood barrier.

After several branching of such respiratory bronchioles, the alveoli are so densely packed along the airway that an airway wall proper is missing; the airway consists of alveolar ducts. The final generations of the airway tree end blindly in the alveolar sacs. The branching pattern plays a role in determining air flow and particle deposition.

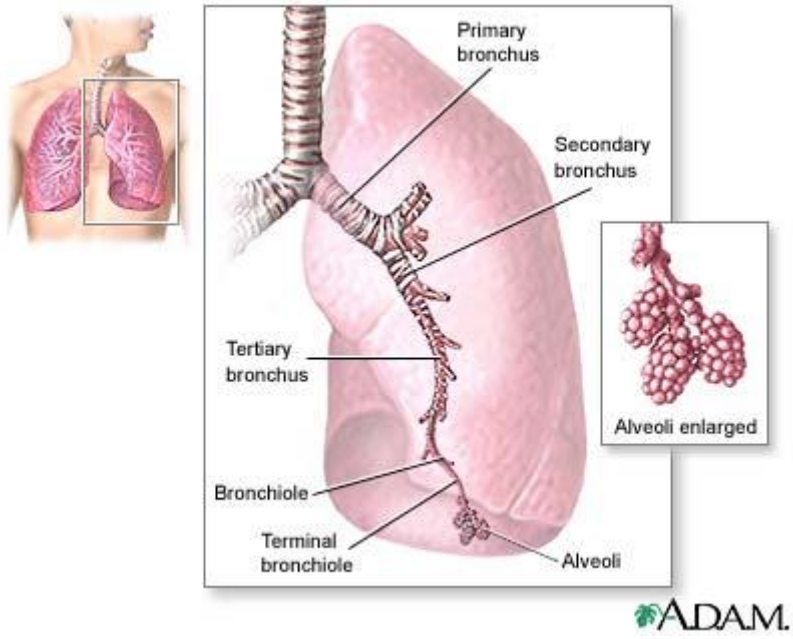
LUNGS:

Lungs are paired organs of respiration. They are situated one on each side of the mediastinum with the thoracic cavity. Each lung resembles a half cone. It has an apex, a base, medial surface and costal surface.

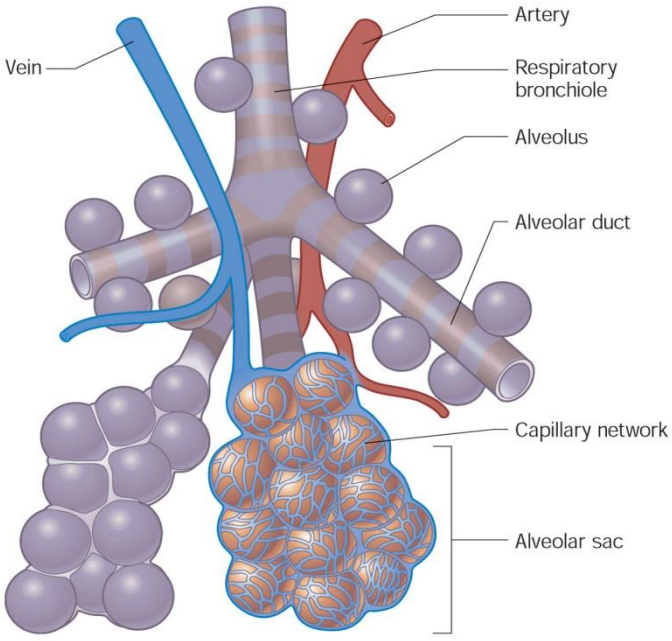
Right lung is broader than the left lung andrepresents 56 percent of the total lung volume and divided in to three a superior, middle, and inferior lobe, separated from each other by a deep horizontal and an oblique fissure, , where as the left lung smaller in volume because of the asymmetrical position of the heart and divided in to two lobes by oblique fissure.The apex is rounded and rises into the roof of the neck about 25mm above the level of middle third of the clavicle. The base is concave and semilunar in shape and is closely associated with the thoracic surface of the diaphragm.

The costal surface in convex and in closely associated with the costal cartilages, the ribs and the intercostal muscles. The medial surface in concave and has roughly triangular shaped area, called hilum at the level of 5^{th}, 6^{th} and 7^{th} thoracic vertebra. Structures that enter and leave at the hilum are 1 bronchus, 1 pulmonary artery, 2 pulmonary veins, 1 bronchial artery, 1 bronchial vein, lymph vessels, parasympathetic and sympathetic nerves. The area between the lungs is the mediastinum. It is occupied by heart, great vessels, trachea, right and left bronchi, oesophagus, lymph nodes, lymph vessels and nerves.

LUNG



ALVEOLAR SAC



PLEURA AND PLEURAL CAVITY:

The inside of the thoracic cavities and the lung surface are covered with serous membranes, respectively the parietal pleura and the visceral pleura, which are in direct continuity at the hilum. Depending on the subjacent structures, the parietal pleura can be subdivided into three portions: the mediastinal, costal, and diaphragmatic pleurae. The shape of the lungs is determined by the shape of the pleural cavities. Because of the presence of pleural recesses, which form a kind of reserve space, the pleural cavity is larger than the lung volume.

During inspiration, the recesses are partly opened by the expanding lung, thus allowing the lung to increase in volume. The lungs are maintained in close apposition to the thoracic wall by a negative pressure between visceral and parietal pleurae. A thin film of extracellular fluid between the pleurae enables the lungs to move smoothly along the walls of the cavity during breathing.

THE GAS-EXCHANGE REGION:

The gas-exchange region comprises three compartments: air, blood, and tissue. Whereas air and blood are continuously replenished, the function of the tissue compartment is twofold: it provides the stable supporting framework for the air and blood compartments, and it allows them to come into close contact with each other (thereby facilitating gas exchange) while keeping them strictly confined. The respiratory gases diffuse from air to blood, and vice versa, through the 140 square metres of internal surface area of the tissue compartment. The gas-exchange tissue proper is called the pulmonary parenchyma, while the supplying structures, conductive airways, lymphatics, and non-capillary blood vessels belong to the non-parenchyma.

BLOOD SUPPLY:

The bronchial circulation has a nutritional function for the walls of the larger airways and pulmonary vessels. The bronchial arteries originate from the aorta or from an intercostal artery. The capillaries surround the walls of bronchi and vessels and also supply adjacent airspaces. Most of their blood is naturally collected by pulmonary veins. Small bronchial veins exist which originate from the peribronchial venous plexuses and drain the blood through the hilum into the azygos and hemiazygos veins of the posterior thoracic wall.

LYMPHATIC DRAINAGE

The lymph is drained from the lung through two distinct but interconnected sets of lymphatic vessels. The superficial, subpleural lymphatic network collects the lymph from the peripheral mantle of lung tissue and drains it partly along the veins toward the hilum. The deep lymphatic system originates around the conductive airways and arteries and converges into vessels that mostly follow the bronchi and arterial vessels into the mediastinum.

NERVE SUPPLY

The pleurae, the airways, and the vessels are innervated by afferent and efferent fibres of the autonomic nervous system. Parasympathetic nerve fibres from the vagus nerve (10th cranial nerve) and the fibres stimulate bronchial constriction. sympathetic nerve are derived from spinal segmentT2to T5. The sympathetic fibres mediate a vasoconstrictive action in the pulmonary vascular bed and a secretomotor activity in the bronchial glands.

RESPIRATION

Inflation and deflation of the lungs ensues that regular exchange of gases takes place between alveoli and external air. This is dependent upon the arrangement of pleura and the contraction and relaxation of muscles of respiration and the elastic connective tissue.

MUSCLES OF RESPIRATION:

The expansion of the chest during inspiration occurs partly voluntary and partly involuntary. The muscles of normal quiet breathing are the inter costal muscles and the diaphragm. During difficult breathing they are assisted by the muscles of the neck, shoulder and abdomen.

CYCLES OF RESPIRATION:

This occurs 12-15 times per minute and consists of three phases.

- Inspiration
- Expiration
- Pause

INSPIRATION:

The capacity of the thoracic cavity is increased by simultaneous contraction of the inter costal muscles and the diaphragm. The parietal pleura move with the walls of thorax and the diaphragm. This reduces the pressure in the pleural cavity to the level considerably lower than the atmospheric pressure. The visual pleura follow the parietal pleura. During the process, the lungs are stretched; the pressure within the alveoli and the air passage reduced drawing air into the lungs in an attempt to equalize the atmospheric and alveolar air pressure.

The process of inspiration is active as it requires expenditure of energy for muscle contraction. The negative pressure created in the thoracic cavity aids venous return to the heart and is known as respiratory pump

EXPIRATION:

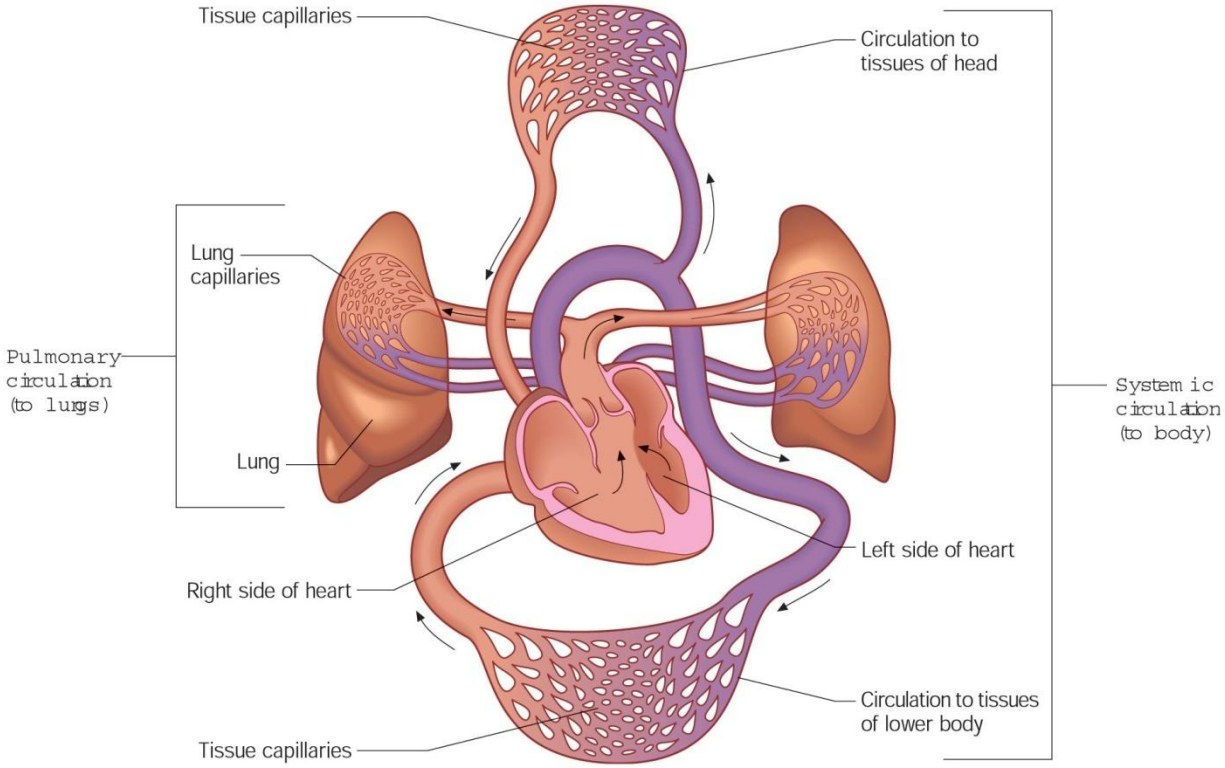
Relaxation of inter costal muscles and the diaphragm results in the downward and inward movement of the rib cage and the elastic recoil of the lungs. As this occurs, the pressure of the gases inside the thorax exceeds the atmospheric pressure and therefore air is expelled from the respiratory tract. The lungs still contain some air and are prevented from complete collapse by the intact pleura. The process is passive as it does not require the expenditure of energy.

After expiration there is a pause, before the next cycle begins.

PULMONARY FUNCTION TESTS:

Pulmonary function tests are a broad range of tests that measure how well the lungs take in and exhale air and how efficiently they transfer oxygen into the blood. ulmonary function tests (PFTs) are noninvasive diagnostic tests that provide

PULMONARY CIRCULATION



measurable feedback about the function of the lungs. By assessing lung volumes, capacities, rates of flow, and gas exchange, PFTs provide information that help to evaluated and diagnosis certain lung disorders. They may not be able to detect early stages of the diseases in which function has not been appreciably reduced.

TESTING FOR VENTILATOR CAPACITY:

The simplest test of dynamic ventilatory function is the tests of forced expiration. A spirometer is used for this test, and the procedure is called spirometery. Nowadays, computerized spirometery is available which gives a print out of the data, as well as the predicted value.

LUNG VOLUMES AND CAPACITY:

In normal quiet breathing there are about 15 complete respiratory cycles per minute. The lungs and air passages are never empty and as the exchange of gases take place only across the wall of the alveolar ducts and alveolar. The remaining capacity of the respiratory passages is called the anatomical dead space (about 150ml).

TIDAL VOLUME:

The volume of air breathed in and out of lungs in a single normal quite respiration.It signifies the normal depth of breathing .Normally it is about 500ml.

INSPIRATORY RESERVE VOLUME:

It is an additional amout of air that can be inhaled into the lungs after the end of normal inspiration beyond the tidal volume.normal value is 3300ml.

EXPIRATORY RESERVE VOLUME:

Maximal volume of air which can be expired out forcefully after the expiration of a tidal volume or normal breath. It is about 1000ml .

RESIDUAL VOLUME:

The volume of air remaining in the lung seven after forced expiration.It cannot be measured by spirometry.It is significant because it help to aerate the blood in between breathing and expiration.It is about 1200ml.

LUNG CAPACITIES:

Four lung capacities are recognized and each includes two or more lung volume.

INSPIRATORY CAPACITY (IC):

It is the maximum volume of air that can be inspired by forced inspiration after a normal expiration. IC = TV+IRV

500+3300=3800ml

VITAL CAPACITY (VC):

It is the maximum amout of air that can be expelled by a forced expiration after a maximum inspiration.VC= IRV + TV + ERV

3300+500+1000=4800ml.

FUNCTIONAL RESIDUAL CAPACITY (FRC):

It is the volume of air remaining in lung at the end of a normal expiration. The FRC is physiologically very important. If there is no FRC and the lung is completely emptied during each respiratory cycle, the alveolar PO2& PCO2 will vary widely during breathing and will interfere with diffusion of respiratory gases.

CFR =ERV + RV

1000+1200=2200ml

TOTAL LUNG CAPACITY (TLC):

The amount of air present in the lungs after a maximal(deep) inspiration.

TLC=IRV+TV+ERV+RV

3300+500+1000+1200ml

ALVEOLAR VENTILATION:

This is the volume of air that moves into and out of the alveoli per minute. It is the tidal volume minus the anatomical dead space, multiplied by the respiratory rate.

Alveolar ventilation = (TV-anatomical dead space) respiratory rate

= (500-150) ml x 15 per minute = 5.25liters / minute.

Lungs function tests are carried out to determine respiratory function and are based on the parameters out lined above.

EXTERNAL RESPIRATION:

This is the exchange between alveoli and blood. Total area of gas exchange in the lungs is 70-80 square meters. CO_2 diffuses from venous blood along the contraction gradient into the alveoli until equilibrium with alveolar air is reached. By the same process O_2 diffuses from alveoli to the blood.

INTERNAL RESPIRATION:

This is the exchange of air between the tissue and blood. When there is difference in partial pressures, oxygen diffuses outward from the blood to extra cellular fluid then into the cell walls. The process involved is diffusion.

Control of Respiration:

Control of respiration is normally involuntary. Voluntary control is exerted during activities such as speaking, singing but is over ridded if homostasis of arterial PO_2 and PCO_2 is threatened i.e. if this is high arterial PCO_2 or low arterial PO_2.

THE RESPIRATORY CENTRE

This is formed by group of nerve cells that control the rate and depth of respiration. They are situated in the brain stem and depending upon the situation they are classified into two groups

- Medulla center
- Pontine center

In the medulla there are inspiratory neurons and expiratory neurons. Neurons in the pneumotoxic and apneutic centre situated in the pons influence the inspiration and expiratory neurons of the medulla.

Motor impulses leaving the respiratory centre pass in the phrenic nerves and inter costal nerves top the diaphragm and inter costal nerves.

Chemoreceptor:

These are the receptors that response to the changes in chemical constituents of blood . these receptors are the sensory free nerve ending,which are highly sensitive to chemical change in blood.They are located centrally and peripherally.

Central receptor- Present on the surface of medulla oblongata and bathed in CSF.When PCO_2 raised even slightly, the Central receptors respond by stimulating respiratory centre, by increasing ventilation and reducing PCO_2. The sensitivity to raised PCO_2 is the most important factor in maintaining hemostasis of blood gases in health.

Peripheral chemoreceptors are situated in the arch of aorta and in the carotid bodies.

An increase in H^+ Concentration Stimulated the Peripheral chemoreceptors resulting in increased Ventilation, increased Co_2 excretion and reduced P^H ·Others factors influencing respiration are,

- Speech, singing
- Emotional displays
- Drugs e.g. – Sedatives, alcohols
- Sleep

Temperature influenced breathing. In fever, respiration is increased due to increased metabolic rate while in hypothermia it is decreased. It is depressed as in metabolism, temporary changes in respiration occur in swallowing, sneezing and coughing.

BRONCHIAL ASTHMA

Introduction:

Bronchial Asthma (the Greek -"panting") is a bronchial hypersensitivity disorder characterized by reversible airway obstruction,produced by a combination of mucosal edema,constriction of the bronchial musculature and excessive secretion of viscid mucus,causing mucous plugs.

Definition:

Asthma is characterized by recurrent attacks of dyspnea, cough with expectoration of tenacious muciod sputum and usually wheezing. Symptoms may be mild and may occur only in association with respiratory infection or they may occur in various degrees of severity to the point of being life –threatening.

Prevalence:

The prevalence of asthma increased steadily over the later part of the last century first in developing world current estimates suggest that asthma affects 300million people world-wide and an additional 100million person will be diagnosed by 2025.

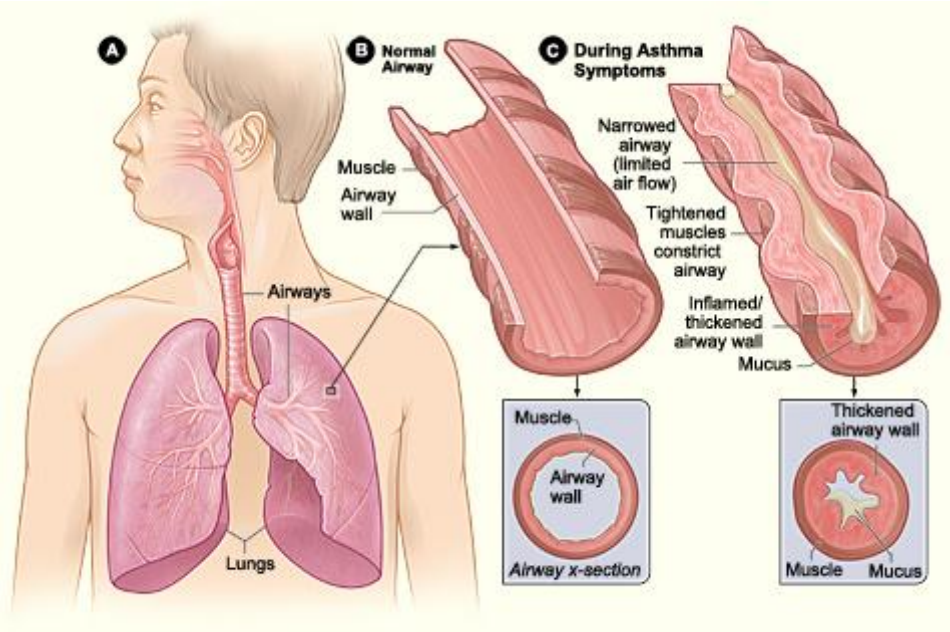
Around age 20, the ratio of asthma between men and women is the same. At age 40, ie in adult age asthma occurs more in females than males in the ratio of 3:1 .

Etiology:

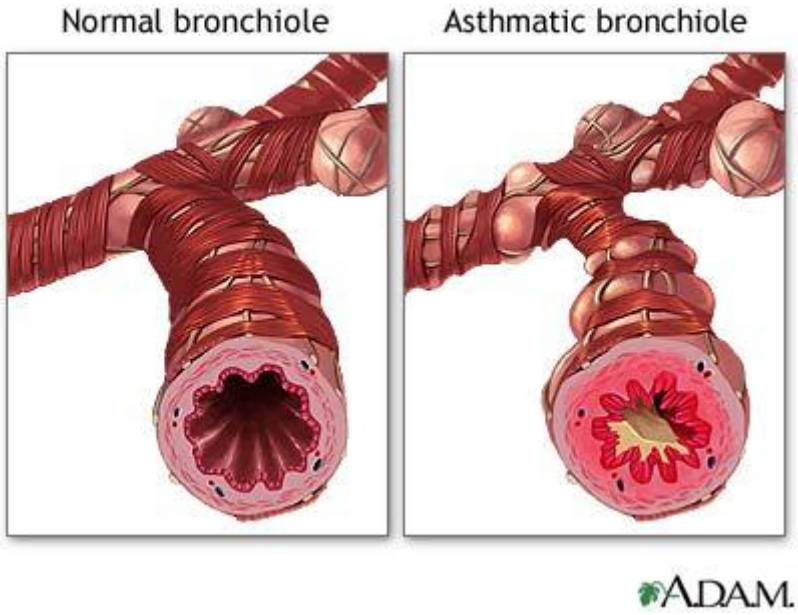
Etiologicaly asthma is heterogeneous disease. There are two types of asthma and Rackemann first introduced the terms “extrinsic” and “intrinsic” asthma in 1947

- Early onset asthma (atopic, allergic, extrinsic)
- Late onset asthma(Non-atopic, Idiosyncratic, Intrinsic)

SYMPTOMS DURING ASTHMA



BRONCHIAL CHANGES DURING ASTHMA ATTACK



Atopic Asthma:

Atopic asthma is the most common type of asthma usually begins in childhood. This disease has been thought to be result from sensitization of the bronchial mucosa by tissue specific antibodies .The antibodies produces a specific immunoglobulin IgE (type 1) class and the total Serum IgE levels are usually .Exposure to the environmental antigens, such as dust, pollens, animal's dander, fungal spores and food result in an antigen antibody reaction. A positive family history of atopy is common, and asthmatic attacks are often preceded by allergic rhinitis, utricaria or eczema. A skin test with antigen results in an immediate wheal and flare reaction, a classic example of type I – IgE mediated hypersensitivity reaction.

Non – Atopic Asthma:

Approximatetly 50% of asthmatics are of the non atopic (intrinsic) type in which the bronchial reaction occurs in response to non immunological stimulai such as infection , irritating inhalants,cold air ,exercise and emotional upset. Associated with nasal polyp and chronic bronchitis are commonly present. About 10% of patients become hypersensitive to drugs. This type of asthma develops later in adult life with negative personal (or) family history of allergy, negative skin test and normal serum levels of IgE.

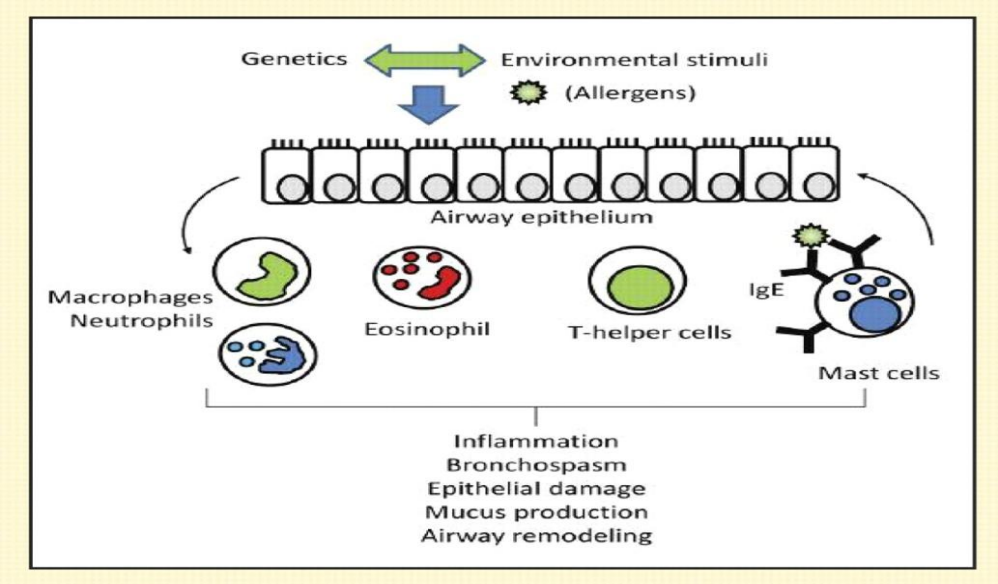
Pathophysiology of Asthma:

The common denominator underlying the asthmatic diathesis is a nonspecific hyper irritability of trachea-Bronchial tree. When airway reactivity is high, symptoms are severe and persistent and the magnitude diurnal fluctuation in lung function is greater .The patients tend to awaken at night or in the early morning with breathlessness.

In both normal and asthmatic patients, air reactivity rises following vital infections of the respiratory tract and exposure to oxidants such as ozone and nitrogen dioxide. Allergen can cause airway responsiveness to rise within minutes and remain elevated for weeks.

A number of causes have been postulated for the increased airway activity of asthma, but the basic mechanism remains unknown. The most popular hypothesis at

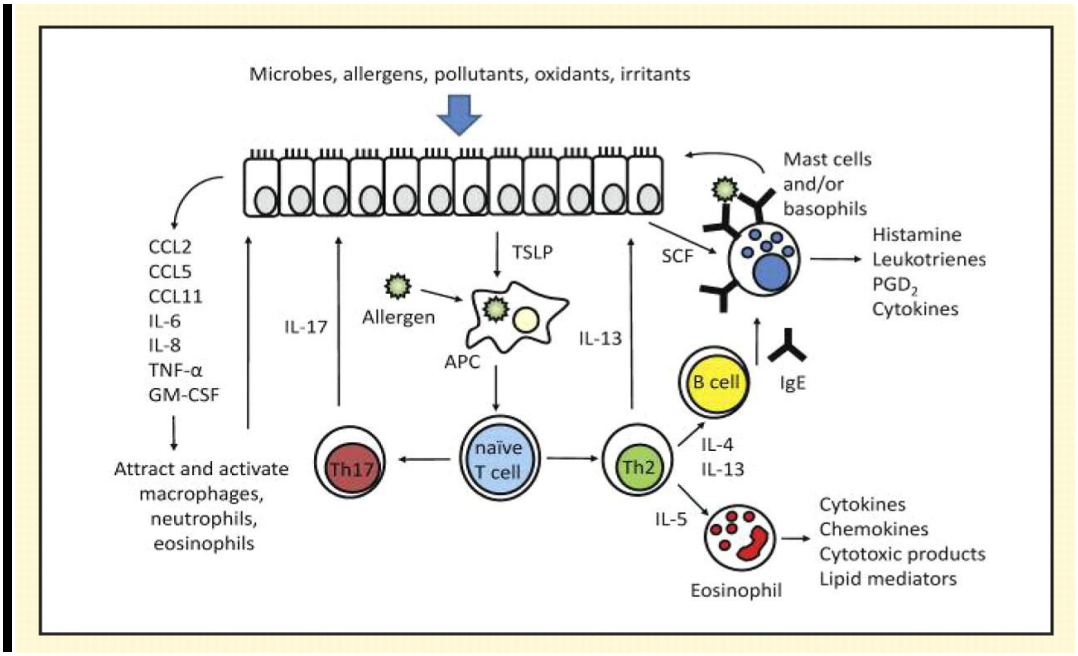
present is that of airway inflammation. Increased numbers of mast cell, epithelial cells, neutrophils, eosinophils and lymphocytes have been found in the broncho alvelolar levage fluid of patients with asthma & have number of mediators.



The airway can be oedematous and infiltered with eosinophils, neutrophils and lymphocytes with or without the smelling of the epithelial basement membrane. There may be glandular hypertrophy. The most obvious finding is a generalized increase in cellularity associated with an elevated capillary density.

Although, the translation of this histological observation into the disease is still incomplete, it widely believed that the physiological and clinical features of asthma derived from interaction among the residence and infiltrating inflammatory cells in the airway and the surface epithelium. The cells that play more important role are mast cells, eosinophils, macrophages neutrophils and lymphocytes. The mediators released are histamine, bradykininm the leukotrienes C, D, & E,platelet activating factor(PAF) and oedema formation.

In addition to their ability to evoke prolonged constriction of airway smooth muscles and mucosal edema, the leukotrienes may also account for some of other patho physiologicalfeatures of asthma such as increased mucous production an impaired mucociliary transport.



Chemo tactic factors elaborated bring eosinophil, platelets and polymorphic nuclear leukocytes to the site of reaction. These infiltrating cells and resident macrophages and airway epithelial cells themselves potentially are and additional source of mediators to enhance immediate and the cellular phase.

Like Mast cells in the early reaction the eosinophils play an important role in the infiltrative components. The granular protein in thin cell major basic protein and the eosinophilic cationic protein are capable of destroying the airway epithelium, which then sloughed into the bronchial lumen in the form of creak bodies. Besides resulting in a loss of barrier and secretary function, such damage elicits the production of chemo static cytokines leading to further inflammation. In theory it also can expose sensory nerve endings, thus irritating neurogenic inflammatory pathways. That in turn, converts a primary local event into a generalized reaction via a reflex mechanism.

T lymphocytes also appear to be important in the inflammatory response. These cells are present in increased number in asthmatic airways and produce cytokines that activate cell-mediated immunity as well as humoral (IgE) immune system.

Furthermore, $Th_{1,}$ Th_2 lymphocyte subtype have functions that may influence the asthmatic response. The Th_1 cytokines interleukin (IL-2) and interferon's (IFN)g can promote the growth and differentiation of b cells and activation of macrophages respectively.

T_{H2} cytokine IL-4 and IL-5 stimulate b cell growth and immunoglobulin section and IL-5 promote eosinophilic proliferation, differentiation and the activation. It can also facilitate granule release from basophiles.

The stimuli that interact with airway responsiveness and incite acute episodes of asthma can be grouped into ten major categories – allergic, pharmacological, environmental, occupational, infections, and exercise – related and emotional stress, food and drink, smoking, heart burn.

Risk factors for Bronchial Asthma

1. Allergens:

Allergies with asthma is a common problem. Eighty percent of people with asthma have allergies to airborne substances such as tree, grass, and weed pollens, mold, animal dander, dust mites, and cockroach particles.

Allergic asthma is dependent on IgE response controlled by T and B lymphocytes and activated by the interaction of antigen with mast cells-bound IeG molecule.

2. Pharmacological stimuli:

The drugs most commonly associated with the induction of acute episodes of asthma are aspirin, coloring agents – tartazine, b- adregenic antagonists, sulfating agent.

Aspirin – sensitive syndrome affects adults through seen in childhood. The problem usually begins with perennial vasomotor rhinitis that is followed by a hyper plastic rhino sinusitis with nasal polyps, progressing to asthma. Indomethacin, fenoprofen, naprocen, zonepirae sodium, ibuprofen, mefanamic acid and phenylbutazone are particularly important.

B-Adrenergic antagonist regularly obstructs the airway in asthmatics. In fact, the local use of b- blockers in the eye for the treatment of glaucoma has been associated with worsening asthma.

3. Environment and Air pollution:

Environmental caused of asthma are usually related to climate conditions that promote the concentration of atmospheric pollutants and antigens. These conditions tend to develop heavily industrial or densely populated urban areas and frequently associated with thermal inversion or other situation that cause stagnant air masses. The air pollutants known to have this effect are ozone, nitrogen dioxide & sulphur dioxide.

4.Occupational factors:

Occupation –related asthma is significant health problem and acute and chronic airway obstructions have been reported to follow exposure to a large number of compounds used in many types of industrial process.

Broncho constriction can result from working with or being exposed to metal salts, wood and vegetable dust, husk of grains, flour, castor bean, gum acacia, karay gum, tragacanth, pharmaceutical agents e.g. antibiotics, piperazine and cimetidine, industrial chemicals and plastics, biological enzymes, laundry detergents and pancreatic enzymes, animal & insect dusts, serum and secretions.

There seems to be three underlying mechanisms

1. In some cases, the offending agent results in formation of significant IgE.
2. Substances cause direct liberations of broncho constrictor substances.
3. Substances cause direct or reflex stimulation of the airway of latent of frank asthmatics.

6. Infections:

Cold, flu, bronchitis, and sinus infections can cause an asthma attack. These respiratory infections that trigger asthma can be viral or bacterial .This airway sensitivity that causes the airways to more easily narrow can last as long as two months after an upper respiratory infection. It's thought that anywhere from 20% to 70% of asthmatic adults have coexisting sinus disease. Conversely, 15% to 56% of those with allergic rhinitis (hay fever) or sinusitis have evidence of asthma.

7.Exercise:

Strenuous exercise can cause a narrowing of the airways in about 80% of people with asthma. In people, exercise is the main trigger for their asthma symptoms. In exercise-induced asthma, some patient feel chest tightness, coughing, and difficulty breathing within the first five to eight minutes of an aerobic workout. These symptoms usually subside in the next 20 to 30 minutes of exercise, but up to 50% of those with exercise-induced asthma may have another asthma attack six to 10 hours later. It is important to warm up slowly and adequately prior to rigorous exercise. This may prevent an attack.

The mechanisms, by which exercise produce obstruction, may be related to a thermally produced hyperthermia and engorgement of the microvasculature of the bronchial wall and doesn't appear to involve smooth muscle contraction.

8.Emotional Stress:

Psychological factors can interact with the asthmatic diasthesis to worsen or ameliorate disease process. Changes in airways caliber seem to be mediated through modification of nasal efferent activity, but endorphins also may play a role.

9.Food and Drink:

Food allergies can cause mild to severe life-threatening reactions. Atopic asthmatics may occasionally notice that their symptoms are provoked by certain foods or drinks The most common foods associated with allergic symptoms are:

- Eggs
- Cow's milk
- Peanuts
- Soy
- Wheat
- Fish
- Shrimp and other shellfish
- Salads and fresh fruits

Food preservatives can also trigger asthma. Sulfite additives, such as sodium bisulfite, potassium bisulfite, sodium metabisulfite, potassium metabisulfite, and sodium sulfite, are commonly used in food processing or prepadration and may trigger asthma in those people who are sensitive.

10.Smoking:

Smokers appear to be at greater risk of developing asthma and have a higher prevalence of hyper-reactivity. Children of smokers also seem to have and increased risk of developing wheeze. Women who smoke during pregnancy increase the risk of wheezing in their babies. Babies whose mothers smoked during pregnancy also have worse lung function than non –smoking mothers.

11.Heartburn and Asthma:

Severe heartburn and asthma often go hand-in-hand. Recent studies show that up to 89% of asthma patient also suffer from severe heartburn, known as gastroesophageal reflux disease (GERD). GERD generally occurs at night when the sufferer is lying down. Normally a valve between the esophagus and stomach prevents stomach acids from backing up into the esophagus. In GERD, the valve does not function properly. The stomach acids reflux, or back up, into the esophagus; if the acid reaches into the throat or airways the irritation and inflammation can trigger an asthma attack.

CLINICAL FEATURES:

1. The symptoms of asthma consist of a triad of dyspnoea, cough and wheezing the last often being regarded as the sine quo none. In its most difficult form, asthma is and episodic disease and all the three symptoms co-exist. At the onset of attack patient experiences a sense of constriction in the chest often with a non-productive cough.
2. Respiration becomes predominant, expiration is prolonged patient frequently has tachypnoea, tachycardia and mid-systolic hypertension. The lungs rapidly become over-inflated and antero posterior diameter is increased. The lungs rapidly become over-inflated and antero posterior diameter is increased.
3. If the attack is severe or prolonged, there may be loss of adventitious breath sounds and wheezing becomes very high pitched.Further the accessory

muscles, which become visible active and a paradoxical pulse often develops. These two sings have been found to be extremely valuable indicating the severity of the obstruction.

4. Pulmonary function tends to be significantly more impaired. The development of paradoxical pulse depends on the generalization of large negative intra thoracic pressure. Thus, if the patient's breathing even though obstruction is quite severe.
5. The end of the episode is frequently marked by a cough, that produce stingy mucus which often takes the form of casts of the distal airway crushman's spirals and when examined microscopically often shown eosinophils and charcot- leydan crystals.
6. In extreme situation, wheezing may lessen markedly and even disappear cough may become extremely in effective and the patient may begin a gasping type of respiratory pattern. These finding imply extensive mucous plugging and impeding suffocation. Ventilatior assistance required. Atelectasis due to insppissated secretion occsasionlly occurs with asthmatic attack.
7. Less typically, a patient with asthma may complain of intermittent episode of nonproductive cough or excretional dyspnoea. Unlike other asthmatics, when the patients are examined during symptomatic period, they tend to have normal breathing, but may have wheeze after repeated forced expiration and or may have ventilator impairments when tested in the laboratory. In the absence of these signs a broncho-provococation test may be required to make the diagnosis.

1. **Acute Severe Asthma (Status Asthmticus)**
   1 It is a medical emergency;
   2 Patient is hypoxic and cyanosed due to severe bronchospasm.
   3 Severe dysphoea, unproductive cought, patient adopts an upright position fixing the shoulder gridle to assist the accessory muscles of respiration
   4 It is characterized by tachycardia (Pulse rate> 120) Tachyphoea (respiratory rate> 30/minute) sweating, pulsus paradoxus, altered level of consciousness and an inspiration, expiration ratio of 1:3 or 1:4.
   5 The presence of a silent chest and bradycardia in such patients is an ominous sign.

ACUTE SEVERE ASTHMA-GRADE

Grade$_1$A: Able to carry out house work or job with moderate difficulty.

Sleep occasionally disturbed.

Grade$_1$B: Only able to carry out house work or job with great difficulty.

Sleep frequently disturbed.

Grade$_2$A : Continued to chair (or) bed, but also to get up with moderate

difficulty. Sleep disturbed, with little or no relief from inhaler.

Grade$_2$B: Confined to chair or bed and only able to get up with great difficulty unable to sleep. Pulse over 120/min

Grade 3: Totally confined to chair or bed. No sleep. No relief from inhaler.Pulse over 120/min.

Grade 4 : Immobilized and completely exhausted.

1. **Nocturnal Asthma**

Nocturnal asthma is defined as an overnight fall of more than 20% in the FEV, or PEFR. It may be due to

a. Early morning fall in circulating adrenaline

b. Overnight changes in vagal tone (increased vagal tone in early morning)

c. Airway cooling at night

d. Circadian changes in plasmas cortisol concentration (mid night to early morning fall in cortisol level

2. **Cough Variant Asthma**

Cough may be the dominant symptoms and the lack of wheeze (or) breathlessness.

3. **Asthma**

Worsening of asthma after meals or dyspnoea occurring only after meals is due to gastro-oesophageal reflex.

DIAGNOSIS AND INVESTIGATION

An account of episode wheeze, breathlessness interpreted with period of normality is sufficient evidence to suspect asthma and further evidence comes from a history or marked variability, attacks in small hours of the night, provocation by strong exercise and allergens and paroxysmal cough, productive small amount of sticky sputum.

CONFIRMATION OF THE DIAGOSIS

1. Lung function tests:

Pulmonary or lung function tests are simple and safe investigations routinely used in clinical practice for the diagnosis and evaluation of a variety of respiratory diseases.The physiological function of the lung can be accurately measure by lung functional testing. Many sophisticated tests are possible but even the simplest equipment can produce useful information. It is of particular value to perform lung function tests in order to give an objective assessment to lung performance. The commonest reason for performing a lung function test is to reach a diagnostic. In addition, there can be most useful for following the progress of a disease and for testing objectively the effects of treatment.

2. Spirometry:

There are many types of spiroment available and all record similar information. A spirometry test measures the volume of air that you are able to expel from the lungs after taking a full breath in.

The normal forced vital capacity (FVC) is fully exhaled in less than 3 seconds more than three quarter is exhaled in the first second. In addition to measuring the vital capacity in liters, volume expired in first second of the first second or first expiratory volume at 1 second (FEV_1) can be measured and the ratio of FEV_1 : FEC can be calculated. The results are compared with predicated values based on age height and ethnic group. FEV_1/FEC ratio is normally greater than 70%.

If diffuse airflow obstruction is present, the rate at which the air can be exhaled is diminished throughout expiration. The length of expiration is prolonged and FEV_1 is much reduced. This is an obstraction pattern and is seen in as time, chronic bronchitis and emphysema. In patients with asthma this obstruction may be reversible with bronchodilators or even corticosteroids.

In a restrictive pattern, there is a reduced lung volume, perhaps as a result of pulmonary fibrosis or that wall deformity but there is no obstruction to airflow and FEV_1 in normal.

3. Peak Expiratory Flow Meter.

It is a popular instrument for assessing airflow obstruction there is a cheap, simpler version called the mini peak flow meter which is suitable for use at home by individual patients. Those machines measure the maximal rate of flow which is achieved during a forced expiration and most healthy people will achieve values of greater than 400 liters/min. Patients with lung fibrosis and restriction changes on the spirogram may also have normal expiratory flow rates so the meter is not suitable for assessment of their disability. Patients with airflow obstruction will have reduced flow rates, which values below 200 liters/min being very significant and those below 100 liters/min extremely severe.

4. Flow Volume Curves

The plotting of flow versus volume during both maximal expiratory and inspiratory maneuvers is of major help in differentiating central airflow obstruction (leading to strider) from diffuse airflow obstruction as seen in COPD and Asthma.

5. Lung Volumes

Measurement of total lung capacity and residual volume is best performed using a whole body plethysmograph, but can be measured by a helium dilution method. In general, restrictive lead to reduced values, and obstructive defects to increased values.

6. Measurement of Diffusing Capacity

The diffusing capacity (DLCO) is a measure of lung's ability to transfer gas from alveoli to blood. The test utilized of carbon monoxide from a single breath of 0.3 % mixture in air, this gas is chosen because it combines rapidly with hemoglobin and provides a true estimate of diffusion across the alveolar capillary membrane. The diffusing capacity is reduced in patients with disease principally affecting alveoli such as fibro sing alveoli is or emphysema. The transfer coefficient (KCO) is a measure of diffusing capacity expressed per volume of ventilated lung during the single breath test and is useful to confirm that low DLCO is due to alveolar disease rather than misdistribution of ventilation. High values of DLCO may be seen in alveolar hemorrhage.

7. Arterial Blood Gases and Oximetry

Measurement of hydrogen ion concentration PaO_2 and $PaCO_2$, derived bicarbonate of arterial blood are essential in assessing the degree and type of respiratory failure and for measuring overall acid-base status. Use of a pulse oximeter allows a non-invasive continuous method of assessing oxygen saturation in patients who require continuous method of assessing oxygen saturation in patients who required continuous monitoring in order to assess hypoxemia and its response to therapy, including supplemental oxygen.

8. Exercise Tests

Formal exercise testing with measurement of metabolic gas exchange and respiratory and cardiac response using cycle aerometry or treadmill exercise is useful in providing a detailed analysis of both pulmonary and cardiac function in the breathless patients. Exercise challenge with measurement of spirometry before and after can also be helpful in demonstrating exercise – include asthma. Finally, the 6 minute walk test or 'shuttle' test can provide a simple but adjective assessment of disability and response to treatment.

9. Skin Hypersensitivity Test

A prick is made in the skin with a fine needle through a drop of an aqueous extract of the substance to be tested. A positive reaction is indicated by the development of a wheal and flare, which begins to appear within few minutes. Tests are usually performed with a group of common allergens knows to cause bronchial asthma. It is seldom possible with these tests to identify the one particular allergens as the causes of asthma are an individual patient and their chief vale is to distinguish atopic from non-atopic subjects.

10. Physical Signs of the Chest

During an attack of asthma, the following signs are detectable.Respiratory rate is increased with the use of accessory muscles of respiration. Hyper – resonant percussion note over the lungs. Breath sounds are vesicular in character with prolonged respiration. Numerous high pitched polyphonic expiratory and inspiratory rhonchi are audible.During very severe attacks the airflow may be insufficient to produce rhonchi. This results in a 'Silent Chest' which is an ominous sign. In between attacks the chest is clear and no abnormal physical signs may be detectable. Chronic asthmatics usually have some scattered rhonchi persisting always in their chest.

11. Radiology Examination

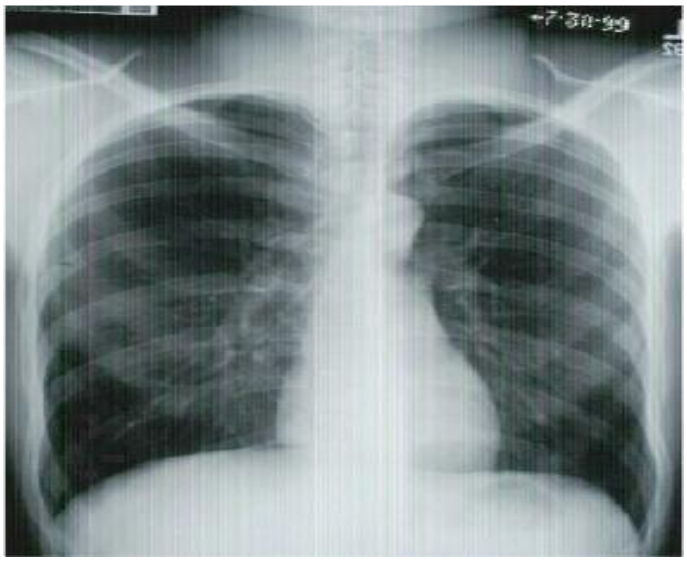
In an acute attack of asthma, the lungs appear hyper inflate. Between episodes the chest x-ray is usually normal. In long standing case, the appearance may be indistinguishable from hyper-inflation caused by emphysema and a lateral view may demonstrate a 'pigeon chest' deformity. Occasionally when a large bronchus is obstructed by tenacious mucus, there is opacity caused by lobar of segmental collapse.

A chest x-ray should be performed if possible in all patients with severe acute asthma to exclude pneumothorax a rate but potentially fatal complication of the pulmonary hyper – inflation produced by severe airflow obstruction in asthma. The chest x-ray show meditational and subcutaneous emphysema in very severe disease.

12. Sputum Examination

Sputum eosinophilia is useful indication of an asthmatic type of airway reaction. Stained section of sputum fixed in alcohol or formalin is probably severe indication of asthma than a sputum eosinophil count. This is useful for the demonstration of aspergillums fumigates. Eosinohhils are a prominent feature of the inflammatory exudates within the airway lumen lies a thick tenacious mucus which under the microscope is seen to contain strips of desquamated epithelial cells (Curschman's spirals) eosinophils, isolated metaplastic epithelial cels (Creola bodies) & crystalline materials consisting largely of major basic protein derived from eosinophilic granules. (charcot – leydon crystals).

NORMAL X - RAY



PEAK EXPIRATORY FLOW METER

DIFFERENTIAL DIAGNOSIS

The differentiation of asthma from other disease associated with dyspnoea, wheezing is usually not difficult, particularly when the patient in seen during acute attacks.

The physical sign and symptoms listed above and the history of periodic attacks are quick characteristic. A personal history or family history of allergic disease such as eczema, rhinitis or urticaria is valuable contributory evidence. An extremely common feature of asthma is nocturnal awakening with dyspnoea and / or wheezing. In fact, the phenomenon is so prevalent that, its absence raises doubts ballot the diagnosis.

1. Difference between Cardiac Asthma and Bronchial Asthma

S.No	FACTORS	CARDIAC ASTHMA	BRONCHIAL ASTHMA
1	Past history	Hypertension, aortic or coronary disease	Previous attacks of asthma or other allergic conditions in patients of other member of the family
2	Age	Onset usually after 50y yrs	Any age
3	Precipitating factors	May be precipitated by execration or acute myocardial infarction or hypertension	Trigger factors may by infected non specific irritants, external, allergies, exercise of emotional factors
4	Symptoms a. Cough	Cough and dyspnoea, cough associated with watery expectoration which increases in intensity towards end of attacks.	Starts with dyspnoea, expectoration of small sticky sputum, paroxysm of wheezes when cough becomes profuse

2. Difference between Bronchial Asthma and Plumonary Tuberculosis

S.NO	FACTORS	PLUMONARY TUBERCULOSIS	BRONCHIAL ASTHMA
1	Age	Generally aged persons	Usually starts before 3 yrs of age
2	History	History of chronic cough	History of previous attacks
3	Duration of symptoms	May last longer	May last up to old age
4	Time of onset	-	Early onset
5	Mode of onset	May be precipitated lay infection	May be precipitated by allergy
6	Loss of weight	Common	Seldom
7	Symptoms:		
	i.Fever	Various extent	Rare
	ii.Cough	Frequent, sharp, short, may be dry in the early stages, later it is persistent with copious, purulent, expectoration dyspnoea is later feature.	Paroxysmal cough more than dyspnoea
	iii.wheezing	Localized wheezing due to bronchial narrowing by tuberculoses lymph nodes	Wheezing present all over the Field
	iv.Sweating	Especially during night	Rare, unless in asthmatics
	v.Haemoptysis	Early stage blood stained sputum	Nothing relevant

8	Inspection	Affected side of chest flattered with displaced, apex impulse to the side of lesion, clubbing of fingers, present	No flattering of the chest apical impulse in position.
9	Palpation	Movement of chest in affected side, vocal fermitus diminished, increased in consolidation, Iymphadenopathy is noted	In Long-standing cases, right ventricular enlargement
10	Percussion	Dull note in the apex, others impaired	Normal
11	Auscultation	Breath sounds bronchial early wheezing, late creak ling rales, diminished vocal resonance in early and increased in later conditions	Prolonged expiration wheezing rhonchi heard all over the field
	a.Pulse	Increased or low	Normal or low
	b. Blood pressure	Low	Normal or low
	c. Signs of underlying disease	–	No evidence of cardio vascular disease
	d. sputum	Hard, thick, tenacious sputum, positive in culture	Sticky pellets
	e. Blood	Lymphocyosis, raised ESR	Eosinophils, ESR normal

3. Difference between Bronchial asthma and COPD

s.no	Parameter	Bronchial asthma	COPD
1.	Clinical	Young age of asthma Associated history of allergy(rhinitis,urticaria, eczema) evidence of corpulmonale-absent sign of hypercarbia unusal	More older people History of smoking, exposure to pollution. No history of allergy corpulmonale-frequent sign of hypercarbia frequent -
2.	Airflow obstruction	Variable (irreversible component may be there in late stages)	Progressive deterioration of lung function.
3.	Postmortem	Hyperinflation,mucus plugs(exudates+mucus) No or little emphysema	Excessive mucous (mucoid/purulent) Small airway disease-emphysema
4.	Sputum	Eosinophilia, metachromatic cell,creola bodies.	Neutrophilia.
5.	Surface epithelium	Fragility undetermined	Fragility loss
6.	Bronchiolar mucus cell	Mucus metaplasia debated	Metaplasia/hyperplasia definit
7.	Bronchial smooth muscle	Enlarge mass(large airway)	Enlarged(small air way)
8.	Bronchial glands	Enlarge mass,but no change in mucin histochemistry	Enlarge mass, increased acidic glycoprotein.
9.	Cellular infiltrates	Predominantly CD3, CD4, CD25.Marked esinophilia(activated)	Predominantly CD3,CD8,CD68,HLA-1 Mild esinophilia.

4. Vocal cord dysfunction:

Vocal cord dysfunction may exist alone or with asthma, it is caused by paradoxical adduction of the vocal cords during inspiration, and may disappear with panting, speech, or laughing. Patients with chronic symptoms suggestive of asthma, normal spirometry, poor response to asthma medications, and frequent evaluations should be evaluated for vocal cord dysfunction. Usually, the diagnosis can be made using direct laryngoscopy, but only during symptomatic periods or after exercise. The presence of flattening of the inspiratory limb of the flow-volume loop may also suggest vocal cord dysfunction, but this is only seen in 28% of patients at baseline.

5. Tracheal and bronchial lesions:

A variety of airway tumors are reported to manifest with symptoms similar to those of asthma. These tumors include endobronchial carcinoid and mucoepidermoid tumors and other tracheal lesions can include bronchocentric granulomatosis, subglottic stenosis, subglottic web, tracheal hamartoma, bronchogenic cysts, leiomyoma, and tracheobronchopathia osteoplastica. All these types of tracheal lesions have been reported with symptoms similar to asthma.

Persistent wheeze localized to one area on the chest in associated with paroxysms of coughing indicates the bronchial diseases, such as foreign body aspiration

6. Congestive heart failure:

Congestive heart failure causes engorged pulmonary vessels and interstitial pulmonary edema, which reduce lung compliance and contribute to the sensation of dyspnea and wheezing. Cardiac asthma is characterized by wheezing secondary to bronchospasm in congestive heart failure, and it is related to paroxysmal nocturnal dyspnea and nocturnal coughing.

7. Pulmonary migraine

Pulmonary migraine consists of combined recurrent asthma; cough with thick mucoid sputum; lower back pain radiating to the shoulder; subtotal or total atelectasis of a segment or lobe; and, occasionally, nausea with vomiting–The symptoms are often accompanied closely in time by focal headache. Spastic narrowing of the bronchi is postulated—along with retained mucous secretions, smooth muscle hypertrophy, and thickened bronchial walls—to cause expiratory collapse of selected airways. Cerebral and abdominal vascular migraine episodes are believed to accompany pulmonary migraine.

8. Chronic Bronchitis

In chronic bronchitis, there are no true symptom –free periods and one can usually obtain a history of chronic cough and sputum production as a background upon which acute attack wheezing are superimposed. Frequently patients with this condition will present the episode of breathlessness particularly on exertion and they sometimes wheeze.

Complications:

Mortality is uncommon in asthma but a severe attack may result in respiratory failure and death.

This is more in 'status asthmaticus'. Other complications include frequent respiratory infection, pulmonary collapse due to obstruction by viscid secretions, pneumothorax, and emphysema and cough fracture (fracture of ribs due to violent coughing), children with asthma may show retardation of growth, especially if toiled with corticosteroid on a long term basic. Long standing bronchial asthma, punctured with frequent expiratory infections may lead to emphysema and chronic corpulmonale.

Prognosis:

The prognosis of the individual attack is good, except in severe acute asthma, when there is occasionally a fatal outcome, especially if treatment is inadequate of delayed. Spontaneous remission is fairly common in episodic asthma, particularly in children, but rare in chronic asthma, which can lead to irreversible airflow obstruction.

Seasonal fluctuation can occur in both types of asthma. Atomic subject with episodic asthma are usually worse in the summer, when they are more heavily exposed to antigens, while chronic asthmatics are usually worse in winter months, because of the increased frequency of viral infections.

Prevention:

Avoidance of allergens:

There are few instances, in which a single agent can be identified as the cause for attacks of asthma. These allergens include grass pollens, mites, animal dander, drugs, industrial chemicals such as isocyanates and certain articles of diet. The majority of patients are hypersensitive to a wide range of allergens and attempts to avoid all of them are impracticable.

PROPERTIES OF TRIAL DRUG

The trial drug Thuthuvalayathy Chooranam consists of 13 herbo mineral ingredients. Most of the ingredients are having pungent taste [kaarpu suvai]. Least among them belongs to bitter and astringent taste [kaippu & thuvarppu suvai].

Siddha system of medicine is based on five elements

A **Maruthuva Thanipadal** quotes the formation of six tastes from five elements.

”மண்ணுடனே புனல் தீக்கால் முறையாகச் சேர்ந்திட்டால் வருமே மினிப்புத்
திண்ணமிலம் துவர்ப்பிரசம் சதாகதியோ டார்தீவின் திடமா முறைப்பும்
எண்ணறிய கசப்புமுண்டாம் தண்ணீரில் தணலினைப்பா லெழுமா முவர்ப்பு
உண்ணரிய அறுசுவையின் சிறப்பிதெனுங் குருசித்தர் உரைத்த மறையே”

- மருத்துவத்தனிப்பாடல்

EARTH + WATER	=	SWEET
EARTH + FIRE `	=	SOUR
EARTH + AIR	=	ASTRINGENT
WATER + FIRE	=	SALT
AIR + FIRE	=	PUNGENT
AIR + SPACE	=	BITTER

As per Maruthuva thanipaadal the action and characters of kaarpu, kaippu & thuvarppu suvai as mentioned below

- The pungent taste stimulates appetite.
- It cures the diseases of throat
- It destroys the vitiated kapha.

CHARACTER OF ASTRINGENT TASTE:

“கட்டுவதுசற்றுக் கரகரப் பாக்கும்வது
திட்டமாய் தோற்பதனஞ் செய்வது – மட்டிற்
கொழுப்புநீர் மல்குங் கொழுப்பும் வரட்டல்
தொழிலாந் துவர்ப்பு சுவைக்கு”

- மருத்துவத் தனிப்பாடல்

- Astringent taste controls the hyper secretion of glands in the body.
- It changes the vitiated kapha.

CHARACTER AND ACTION OF BITTER TASTE:

"வேறு காரணம் விளைத்த வூண் வெறுப்

போட்டு மியல்பா யேற்க விரும்பாச்

சுவையாம் பித்தமைய விகர்பங்

வாய்நீருறல் அழற்சியும் தணிக்கும்

மெய்நீர்க் கசிவையுந் தடியையுந் தடியும்

ஊண் சலம் மலஞ்சலம் நிணசலம் என்பினுள் வறட்டும்."

-மருத்துவத் தனிப்பாடல்

- Bitter taste changes the hatred towards food.
- It converts the vitiated kapha and pitha.
- It reduces the hyper secretions of glands in the body.

Considering the actions and characters of kaarppu, kaippu and thuvarppu suvai, the drug is formulated in such a way that the adverse effect of excessive kaarppu is counteracted by kaippu and thuvarppu suvai. Also, kaippu and thuvarppu suvai corrects the deranged dheeshakini in the body and produces good appetite. Both kaippu and thuvarppu suvai has the ability to reduce excessive secretion of the sputum and expel out by expectorant action. Hence kaarppu suvai, by its inherent property antagonizes kapha by having fire as its component.

Generally in kapha disease patient's complaints reduced appetite or anorexia. In Swasa kasam patients their condition gets worse if they suffer from dyspnoea particularly after food due to improper digestion. Siddhars had given us plethora of drugs, mostly combinations of herbs as compound drugs.The drugs Thuthuvalayathy chooranam and one among those formulations. Most of the ingredientsof these drugs have the property of carminative, stomachic, stimulant, which suits for the kapha disease patients.

INGRIDIENTS OF THE TRIAL MEDICINES

1. தூதுவளை:

Botanical Name : *Solanum trilobatum, Linn.*

Family : Solanaceae

Vernacular names

Sans : Alarka

English : Climbing Brinjal

Tamil : Thuthuvalai

Mal : Mullakaththari.

Organoleptic:

Taste **:** Mild Bitter,Pungent

Potency **:** Hot

Division **:** Pungent

Parts Used **:** Leaves, Flower, Unriped Fruit.

Actions **:** Stimulant, Expectorant, Tonic.

Gunam :

தூது பத்திரி யூண்சுவை யாக்கும்பூ

தாது வைத்தழைப் பித்திடும் காயது

வாத பித்தக பத்தையு மாற்றுவேர்

ஓதும் வல்லிபன் நோயுமொ ழிக்குமே.

- தேரையர் குணவாகடம்.

Uses :

- It cures all the Kapha diseases.
- It is used in the treatment of respiratory diseases like cough, asthma, chronic febrile infections, tuberculosis, cardiac and liver diseases.
- The ethanolic extracts of *S. trilobatum* showed mast cell degranulation inhibition property**.**
- The extract exhibit antimicrobial activity against Gram (+) and Gram (-) bacteria.

2. **ஈச்சுரமூலி:**

Botanical Name : *Aristolochia indica.Linn*

Family : Aristolochiaceae

Vernacular names

Sans	:	Ishwari
English	:	Indian birthwort
Tamil	:	Echchura muli
Mal	:	ishrukap-pul,karalekam.

Organoleptic:

Taste	**:**	Bitter
Potency	**:**	Hot
Division	**:**	Pungent
Actions	**:**	Stimulant, Tonic,Emmenagogue.

Gunam :

பெருமருந்தின் வேர்பித்தம் **பீறிரைப்பு காசம்**
வருசுரம் உடம்புவலி வாதம்-உருவுவிஷம்
ஒன்றிய மாகடிகள் ஓட்டும் உலகிலிது
அன்றியது கோச்சிகிச்சைக் காம். -

- அகத்தியர் குணவாகடம்.

Uses: It cures vatha, pitha diseases,cough, asthma,fever,body pain and all poison.

3. **சிற்றரத்தை:**

Botanical Name : *Alpinia officinarum.Linn*

Family: Zingiberaceae

Vernacular names

Sans	:Rasna
English	:Galangal the lesser,Java galangal.
Tamil	: Chittarattai.
Mal	:Aratha.

Organoleptic:

Taste- Pungent

Potency- Hot

Division - Pungent

Actions : Expectorant,Febrifuge,Stomachic .

Parts Used:Root

Gunam :

வாதபித் தங்கரப்பான் வாதஞ் சிரோரோகஞ்
சேர்ந்தகப முத்தோடஞ் சீமோடு-நேர்ந்தசுரம்
மற்றரத்தைக் காட்டி வருமிரும லுந்தீரும்
சிற்றரத்தை வன்மருந்தால் தேர்.

- தேரையர் குணவாகடம்

Uses: The root of this plant is used to cure vatha,kapha diseases,eczema,cough,all type of fever it is use to equlised the three dhoases.

The phytochemical diary heptanoid phenylhept (HMP) in lesser Galangal exhibit the anti-inflammatory properties on mouse macrophage cell line and human peripheral blood mononuclear cells (PBMCs) in vitro. It significantly inhibited lipopolysaccharide (LPS)-stimulated nitric oxide (NO) production. It also inhibited the release of LPS-induced proinflammatory cytokines interleukin-1 beta (IL-1 beta).

4) கருஞ்சீரகம்:

Botanical Name : Nigella sativa .Linn

Family : Ranunculaceae

Vernacular name

Sans :Upakunchika

English :Black cumin,Small fennel

Tamil :karuchirakam

Mal :karinchirakam

Organoleptic:

Taste -Bitter

Potency - Hot

Division -Pungent

Parts used: Seed

Action: Carminative, Stomachic, Parasiticide, Emollient.

Gunam:

கருஞ்சீரகத்தான் கரப்பானொடு புண்ணும்

வருஞ்சிராய்ப் பீநசமு மாற்றும்-அருந்தினால்

காய்ச்சல் தலைவலியுங் கண்வலியும் போமுலகில்

வாய்ச்ச மருந்தெனவே வை. -

- அகத்தியர் குணவாகடம்.

Uses: it is indicated for,

cough,vomiting,nasea,jaunice,eczema,wounds,

peptic ulcer,oedema,flatulanc,internal fever.

Nigellone has proved to be an excellent prophylactic agent for both bronchial asthma and asthmatic bronchitis.

Jewish and Muslim prophets with Mohammed refer to Nigella, reported to have described the seeds as a remedy for "**every illness except death**"

5.இலுப்பைப்பிண்ணாக்கு:

Botanical Name : Madhuca lonifolia .Macbride

Family **:** Sapotaceae

Vernacular names

Sans :Madhaka-vrhaiskha

English : Narrow leaved mohua,south indian mahua.

Tamil :lluppai

Mal :lruppai

Organoleptic:

Taste - Bitter, Astrigent.

Potency - Hot

Division - Pungent

Parts used:

Leaf,flower,fruit,seed, ghee,oilcake,bark,root bark.

Action: emetic

Gunam :

பொத்திக் கடுவனொடு புண்ணுங் கரப்பனும்போம்
வித்ததைப்பு தோடமிவை வீறாவாம்-மெத்தனவே
எண்ணெய்க் கசிவுகளு மேகு மிலுப்பைவிதைப்
பிண்ணாககுக் கென்றாறியப் பேசு

- அகத்தியர் குணவாகடம்.

Uses : Hunch backWound,eczema,threedhosha,oedema

6) சுக்கு:

Botanical Name : *Zingiber officinale, Rose.*

Family : Zingiberaceae

Vernacular names

Sans : Nagaram

English : Dried Ginger

Tamil : Chukku

Mal : Chukku

Organoleptic:

Taste - Pungent

Potency - Hot

Division - Pungent

Action: Stimulant, Stomachic, Carminative

Parts used: Dried rhizome

Gunam:

சூலைமந்தம் நெஞ்செரிப்பு தோடமேப் பம்மழலை
மூலம் **இரைப்பிருமல்** மூக்குநீர் – வாலகப
தோடமதி சாரந் தொடர்வாத குன்மநீர்த்
தோடம்ஆ மம்போக்குஞ் சுக்கு.

- அகத்தியர் குணவாகடம்.

Uses:

It is extremely valuable in dyspepsia, flatulence, colic, vomiting, spasms and other painful affections of the stomach and the bowels unattended by fever; for cold, cough, asthma, dyspepsia and indigestion.

Research studies showed that ginger reduces inflammation and has antioxidant actions. Gingerol has the ability to reduce inflammation of the airways, according to a study published in the December 2010 issue of the "Journal of International Pharmacology."

7) மிளகு:

Botanical Name	:	*Piper nigrum, Linn*
Family	:	Piperaceae

Vernacular names

Sans	:	Maricha
Hindi	:	Kali - mirch
English	:	Black pepper
Tamil	:	Milagu
Mal	:	Kurumulak.

Organoleptic:

Taste	-	Bitter, Pungent
Potency	-	Hot
Division	-	Pungent
Parts used	-	Seed, Stem
Actions	-	Carminative, Antidote, Stimulant

Gunam:

சீதசுரம் பாண்டு **சிலேத்மங்** கிராணிகுன்மம்
வாதம் அருசிபித்தம் மாமூலம் – ஓதுசன்னி
யாசமபஸ் மாரம் அடன்மேகம் **காசமி**வை
நாசங் கறிமிளகினால்.

-அகத்தியர் குணவாகடம்.

Uses:

It is used to treat asthma, chronic indigestion, colon toxins, obesity, sinus, congestion, fever intermittent fever, cold extremities, colic, gastric ailments and diarrhoea.

8) திப்பிலி:

Botanical Name : Piper longum, Linn.
Family : Piperaceae

Vernacular names

Sans : Pippali
English : Long pepperr
Tamil : Thippili
Mal : Thippili

Organoleptic:

Taste - Astrigent
Potency - Hot
Division - Sweet
Parts used : Unriped fruit.
Actions : Stimulant, Carminativ

Gunam:

திப்பிலியின் றண்டுலஞ் **சிலேத்மத்தைப்** போக்கிவிடும்
உப்பிசத்தை மேகத்தை ஓட்டுங்காண் – தப்பாமல்
வாத சுரந்தணிக்கும் மாகபரோ கந்தொலைக்கும்
தாதுவை வளர்ப்பிக்குஞ் சாற்று.

- அகத்தியர் குணவாகடம்

Phytochemicals:

1% of volatile oil, resin, alkaloid, pipperine, piperlonguminine, calcium phosphorous, iron.

Uses:

Powder of Long pepper with honey will relieve cough, cold, asthma, hoarseness and hiccup.

Piperine relieves inflammation, pain and asthma improves and digestion. It has analgesic, ant-pyretic, anti-inflammatory, anti - convulsion and CNS depressant activities.

9) கடுக்காய்:

Botanical Name: *Terminalia chebula. Retz*

Family : Combretaceae

Vernacular names

Sans : haritaki

Hindi : Pile Hara

English : Chebulic Myrobalan

Tamil : Kadukkai

Mal : Katukkai

Organoleptic:

Taste - It has all six taste

Potency - Hot

Division - Sweet

Parts Used - Unripedfruitand fruit.

Gunam :

அபைய கடுக்காய் அரிதகியம் என்பர்

நவைகுட்ட மார்புவலி நாடா – துவலமியம்

வெப்பு **சுவாசம்** விடபாகம் காசம் போம்

ஓப்பில் அதிகபல முன்.

- அகத்தியர் வைத்திய சிந்தாமணி.

Uses :

- Fruits are used in fever, cough, asthma, urinary disease, piles etc.
- Fruits contain astringent substances tannic acid, Chebulinic acid, gallic acid etc.
- It can be used as home remedy against fever, cough, asthma andurinary disease

10) பெருங்காயம்:

Botanical Name: *Ferula asafetida*.

Family: Apiaceae

Vernacular names

Eng :Asafoetida

Tam :Perungayam

San :Hingu

Mal : Perungayam

Organoleptic:

Taste: Bitter,

Potency: Hot,

Division: Pungent

Parts used: Gumresin

Action: Stimulant, Carminative, Antispasmodic, Expectorant .

Gunam

தந்த மூலத்தெழுன்பிணி
சருவகாளம் விருச்சிகங்கீடம்மா
சிலேத்துமத்துறும்வலி
மாயுநாறுநற் காயங்கிடைல்கினே.

-- தேரையர் குணவாகடம்

U**ses:**

It is indicated for all type of poison, ascites, peptic ulcer,pain due to kapham.The smoke of powered asafoetida with vigna mungo is inhaled for asthma.

11. **திப்பிலிவேர்:**

Botanical Name : Piper longum, Linn.

Family : Piperaceae

Vernacular names

Sans : Pipalee-moola

Hindi : Felfelai-maya

English : long pepper root

Tamil : thippili-ver

Mal : kattu-thippili

Organoleptic:

Taste - Pungent .

Potency - Hot

Division - Pungent

Part used: Root

Act ion: Stomachic, Carminative.

Gunam

திப்பிலிவேர் தாகபித்தஞ்சோகந் தணியாச் சுரமிருமல்
மேகங் குரற்கம்மல் மெய்க்கடுப்பும்-ஏகுங்காண்
திப்பிலிமூ லங்கண்டத் திப்பிலிய தாம்நறுக்குத்
திப்பிலியென் றேயொருக்காற் செப்பு.

- அகத்தியர் குணவாகடம்

Uses: It cures fever, cough, sore throat, body pain, loss of appetite.

It cantain pipperine, piper lonumine and dihydrostigmasterol which reduced inflammation of respiratory diseases.

13. இந்துப்பு:

Chemical Name : *Sodium chloride impura*

Vernacular names

English : Rock salt, Halite.

Tamil : Indhuppu

Gunam :

அட்டகுன்ம மந்தம் அசிர்க்கரஞ்சூர் சீதபித்தந்
துட்டவையம் நாடிப்புண் டோடங்கள் – கெட்டமலக்
கட்டுவிட விந்தையக் காமியநோய் வன்கரப்பான்
விட்டுவிட விந்துப்பை விள்.

Ref: Gunapadam Thathu Jeeva Vaguppu

Chemical constituents:

Along with sodium, it contains many other minerals including, calcium, zinc, iron, magnesium, potassium, copper and several other trace minerals.

Uses:

- Rock salt is used for sneezing, colds, eczema, hives, thrush, menstrual problems, and migraine.
- It is given to promote digestion, improve appetite, and relieve constipation.
- sodium chloride solution is used for dehydration, to irrigate the eye, to relieve nasal congestion, and as a mouthwash.
- It is indicated for dyspepsia and other abdominal disorders, cough and asthma.

13.வெங்காரம்:

Chemical name : *Sodii biboras;sodii boras*.

Vernacular names

English : Sodium biborate,pyroborate.

Tamil: Vengaara

Organoleptic:

Taste: Sweet with Asterigent

Potency: Hot.

Action: Diuretic, Emmenagogue, Astringent, Antacid, Local sedative, Antiseptic

Gunam:

வெங்காரஞ் சேத்துமத்தை வேறுபண்ணு மேகடுகு
தங்குசில நீர்முறியத் தான்வாஞ்கும்.

Ref: Gunapadam Thathu Jeeva Vaguppu

Characters:

Borax: $Na_2B_4O_7\ 10H_2O$; Na_2O-16.2%, B_2O_3-36.6%, H_2O-47.2%,

specific gravity:1.7

Borax, also known as a hydrated sodium tetraborate, is one of the most important ofboron compound, a mineral, and a salt of boric acid. It is a soft and light crystalline substance. The colour is greyish white. Exposed to the air it becomes opaque or dirty white.

Uses:

- A mixture of powdered borax and honey is used externally for soreness of mouth and cough.
- Borax is given internally in doses varying from 10- 30 grains (650mgs-2gm) in acidity of the stomach, amenorrhoea, menorrhagia, and puerperal convulsions.

PREPARATION OF THE TRIAL MEDICINES

THUTHUVALAYATHY CHOORANAM (Internal medicine)

Ref : Sarabendra vaithya muraigal-kasaswasa sigitchai, pg no:152-154.

INGREDENTS:

1. Thuthuvalai root bark (*Solanum trilobatum. Linn*) -1/2 padi (670 grams)
2. Echchura muli root (*Aristolochia indica.Linn*) -1 ullaku (366grams)
3. kadukkai (*Terminalia chebula. Retz*) - varagan (8.4grms)
4. Chittarattai (*Alpinia officinarum.Linn*) -varagan (8.4grms)
5. Chukku (*Zingiber officinale. Rose*) - varagan (8.4grms)
6. Karunchirakam (*Nigella sativa .Linn*) - varagan (8.4grms)
7. Milagu (*Piper nigrum. Linn*) - varagan (8.4grms)
8. Thippili (*Piper longum. Linn*) -varagan (8.4grms)
9. Illuppai oil cake (*Madhuca lonifolia .Macbride*) - varagan (8.4grms)
10. kandathippili (*Piper longum. Linn*) -varagan (8.4grms)
11. Perungayam (*Ferula asafoetida .Linn*) - varagan (8.4grms)
12. Indhuppu (Sodium chloride impura) -2 varagan (8.4grms)
13. Vengaaram (Sodium biborate) - ¼ varagan (1 gram)

METHOD OF PURIFICATION*:*

Thuthuvalai root bark (*Solanum trilobatum.Linn*):

It is cleaned with pure white cloth.

Echchura muli root (*Aristolochia indica*)

It is washed in water and cleaned with pure white cloth.

Kadukkai (*Terminalia chebula. Retz*):

Soak the kadukkai in the rice water (kazhuneer) and filter the yellowish tint of the water then the seed is removed from the kadukkai and it is allowed to dry under sun light.

Chittarattai (*Alpinia officinarum*)

The skin of the Chittarattai is removed, cut into pieces and dried.

Chukku (*Zingiber officinale.Rose*):

Double the proportion of calcium carbonate (Lime stone) solution with dry ginger is boiled for three hours, then it is washed well with water and allowed to dry. The outer skin of dry ginger is peeled off.

Karunchirakam (*Nigella sativa*)

The seed are fry it like as golden yellow colour and taken.

Milagu (*Piper nigrum. Linn*):

Soak it in sour butter milk for 1 saamam (three hours).

Thippili (*Piper longum.Linn*):

Thippili is soaked in lemon juice and taken.

Kandathippili (*Piper longum. Linn*)

Remove the nodes &dried.

Illuppai oil cake (*Madhuca lonifolia .Macbride*)

It is soaked in water and dried.

Perungayam (*Ferula asafoetida*)

Purified by fried in a mud vessel.

Indhuppu (Sodium chloride impura):

It is soaked in goat's urine for 3 nazhigai (72 mins) and dried in sun light.

Vengaaram (Sodium biborate)

Purified by fried in a mud vessel until the water content of it evaporates

PREPARATION OF TRIAL DRUG:

STEP1:

The purified **Thuthuvalai root** bark (*Solanum trilobatum. Linn*) is dried in sunlight and made into fine powder with the help of Iron mortar and pestle and filtered with pure white cloth and ½ padi (670 grams) is taken separately.

STEP 2:

The purified **Echchuramuli rootbark** (*Aristolochia indica*) chooranam of 1 ullaku (366grams) is mixed with above said powder.(step 1)

STEP3:

Raw drug (3-12) of each is fried, powered and mixed with above said mixture.(step1&step2)

STEP 4:

¼ varagan (1gram) of the purified powder of Borax is mixed with above said mixture. (step1,2&3)

The finished chooranam is taken and preserved in a air tight containner.

Dose : Verugadi alavu (1.5 gm) Twice daily, After food.

Adjuvant : Honey.

Route of drug administration : Oral route

Course : 1/2 Mandalam (24 days).

Indication : Swasakasam.

Reference : Sarabendra vaithya muraigal-kasaswasa sigitchai, pg no:152-154.

THUTHUVALAYATHY CHOORANAM

PROTOCOL

TITLE:

Pre clinical and clinical study on “swasakasam” (Bronical asthma) and the drug of choice is “Thuthuvalayathy chooranam” (internal)

OBJECTIVES

1) Primary objective:

To evaluate the therapeutic efficacy of the siddha drug **“Thuthuvalayathy chooranam”** (Internal) in the treatment of **“ Swasa Kasam”** .

2) Secondary objective:

- To evalulate the safety profile (Acute, sub - Acute toxicity studies) of the trial drug.
- To study the siddha cofactors towards the efficiacy of medicine.

STUDY DESIGN & CONDUCT OF STUDY:

Study type: an open clinical trial.

Study place : Ayothidasar Pandithar Hosipital ,
Dept of Maruthumam,
National institute of Siddha ,
Tambaram sanatorium , Chennai-47.

Study period : 12 months

Sample size : 40 patients.

TREATMENT

Medicine Name : **THUTHUVALAIYATHY CHOORANAM**.(Internal)

Dose : Verugadi alavu (1.5 gm) Twice daily, After food.

Adjuvant : Honey.

Route of drug administration: Oral route

Course : 1/2 Mandalam (24 days)

DIET AND MEDICAL ADVICE

- Advised to take hot water and hot foods.
- Advised to take bath strictly in warm water.
- Advised to avoid cool water, milk and milk products.
- Advised to avoid factors which cause digestive disturbance.
- Advised to avoid smoking and snuff.
- Advised to avoid allergic factors.

SUBJECT SELECTION:

As and when patients reporting at the OPD of Ayothidass Pandithar Hospital with symptoms of inclusion criteria will be subjected to screening test & documented using screening proforma.

INCLUSION CRITERIA:

1) Age 18 to 60 yrs.

2) Sex: Both male and female.

3) Difficulty in breathing, Tightness of chest, Wheeze - Added sound (Rhonchi), cough with or without expectoration.

4) H/O allergy, sneezing.

5) Patients who are willing to take radiological investigation and provide blood for lab investigation.

6) Patients who are willing to estimate volume of air forcibly expired after a deep inspiration by using Mini-Peak flow meter and PEFR below normal range from 250L/min to 150 l/min for men; from 200L/min to 100 L/min for women ,for those patients are included.

[Normal range of PEFR:

Male: young adult: 400-650 L/min; Above 40 yr: 300-500L/min

Female: young adult: 250-450L/min; Above 40 yr: 200-400L/min]

EXCLUSION CRITERIA:

1. Cardiac disease.
2. Renal disease.
3. Tuberculosis.
4. COPD.
5. Status asthmaticus.
6. Diabetes mellitus.
7. Hyper tension.
8. Pregnancy.
9. Lactation.
10. psychological factor.
11. worm infestation.

WITHDRAWAL CRITERIA:

- Intolerance to the drug & development of adverse reactions during drug trail
- Poor patient compliance & defaulters.
- Patient turned unwilling to continue in the course of clinical trial.
- Occurrence of any serious illness

TESTS AND ASSESMENTS:

A. Clinical assessment.

B. Siddha assessment.

C. Laboratory Investigations

1. Routine investigations
2. Specific investigations

A. CLINICAL ASSESMENT:

- Dyspnoea.
- Dry or protective Cough.
- Wheezing.
- Tightness of chest.
- Sneezing Rhinorrhoea.
- Hoarseness of voice.
- Sleep disturbance.
- Expiration is like a hiss of a serpent.
- Frequent hemming.
- Sense of heat in both nostrils

B.SIDDHA ASSESSMENT

1.Thinai :

- Kurinchi (hill areas)
- Mullai (forest)
- Marutham (fertile land)
- Neidhal (coastal area)
- Palai (desert)

2. Paruva Kalam (season)

- Karkaalam
- Koothir kaalm
- Munpanikaalm
- Pinpani kaalam
- Ilavenil kaalam
- Muthuvenil kaalam

3. **Poripulankal:**

- Mei (Skin etc)
- Vaai (Tongue etc)
- Kan (Eye etc)
- Mooku (Nose etc)
- Sevi (Ear etc)

4.Kanmedriyamand Gnanenthiriyam:

- Vaai (Buccal cavity)
- Kaal (Lower limbs)
- Kai (Upper limbs)
- Eruvaai (Anorectal region)
- Karuvaai (Uro-genital region)

5. **Ezhuudalkattugal:**

- Saram
- Senneer
- Uoon
- Kozhuppu
- Enbu
- Moolai
- Sukkilam /suronitham

6.Ennvagaithervu (Eight types of Examination):

- Naadi
- Sparisam
- Naa
- Niram
- Mozhi
- Vizhi
- Malam
- Moothiram

  -Neerkuri

  -Nei kuri

C.LABORATORY INVESTGATION

SIDDHA PARAMETERS

Malam

Moothiram

-Neerkuri

-Nei kuri

ROUTINE INVESTIGATION

BLOOD

- Hb (gm/dl) -
- Total WBC Count(Cells/cumm) -
- DC- Polymorphs(%) -
- Lymphocytes(%) –
- Eosinophils(%) –
- Monocytes(%) –
- Basophils (%) –
- Total RBC count(Million cells / cumm)-
- ESR(mm/hr) -
- Blood glucose(mg/dl): (Fasting) - (Post – prandial)-
- Blood urea(mg/dl)-
- Serum Creatine(mg/dl)-
- Serum cholesteroSl(mg/dl)-
- HDL cholesterol(mg/dl)-
- LDL cholesterol(mg/dl)-
- VLDL cholesterol(mg/dl)-
- Serum triglycerides (mg/dl)-

Liver function tests

- Serum total bilirubin (mg/dl) -
- Serum Direct bilirubin (mg/dl) -
- Serum Indirect bilirubin (mg/dl) -
- Serum Alkaline phosphotases (u/l) -

- SGOT (u/l) -
- SGPT (u/l) -
- Serum Total Protein (g/dl) -
- Serum Albumine(g/dl) -
- Serum Globulin(g/dl) -
- Serum Calcium (mg/dl) -
- Serum Phosphorous (mg/dl) -
- Serum Uric Acid (mg/dl) –

URINE

- Urine sugar (F)&(PP)
- Albumin
- Deposits

MOTION

- Ova
- Cyst
- Occult blood

SPUTUM

AFB

- **OTHER INVESTIGATION**
  - X Ray Chest (PA view)
  - ECG

SPECIFIC INVESTGATIONS

PEFR(Peak Expiratory Flow Rate) [L/min]

STUDY ENROLLMENT

- In this open clinical trial, patients reporting at the OPD with the clinical symptoms of dyspnoea , cough with or without expectoration, wheeze , tightness of chest ,etc will be examined clinically for enrolling in the study based on the inclusion and exclusion criteria.
- The patients who are to be enrolled would be informed (Form IV-C) about the study, trial drug, possible outcomes and the objectives of the study in the language and terms understandable to them.
- After ascertaining the patient's willingness, informed consent would be obtained in writing from them in the consent form (Form IV-A).

- All these patients will be given unique registration card in which patients' Registration number of the study, Address, Phone number and Doctors phone number etc. will be given, so as to report easily and report any complications .
- Complete clinical history, complaints and duration, examination findings-- all would be recorded in the prescribed Proforma in the history and clinical assessment forms separately. Screening Form- I will be filled up; Form I-A, Form –II and Form –III will be used for recording the patients' history, clinical examination of symptoms and signs and laboratory investigations respectively.
- Patients would be advised to take the trial drug and appropriate dietary advice (Form IV-D) will be given according to the patients' perfect understanding.

CONDUCT OF THE STUDY:

Before starting the course purgation is given with the OP medicine **Mantha Ennai** - *8 ml (od)* **with warm water at early morning in empty stomach**

The trial drug THUTHUVALAYATHY CHOORANAM (Internal) is given continuously for 24 days.

For OP patients, they should visit the hospital once in 7 days. At each clinical visit clinical assessment is done and prognosis is noted. For IP patients the drug is provided daily and prognosis is noted. Laboratory investigations are done 0^{th} day & 24^{th} day of the trial. For IP patients, who is not in a situation to stay in the hospital for a long time is advised to attend the OPD for further follow-up .After the end of the treatment also, the patient is advised to visit the OPD for another 2 months for follow-up. If any trial patient who fails to collect the trial drug on the prescribed day but wants to continue in the trial from the next day or two, he/ she will be allowed, but defaulters of one week and more will not be allowed to continue and be withdrawn from the study with fresh case being inducted.

DATA MANAGEMENT

- After enrolling the patient in the study, a separate file for each patient will be opened and all forms will be filed in the file. Study No. and Patient No. will be entered on the top of file for easy identification. Whenever study patient visits OPD during the study period, the respective patient file will be taken

and necessary recordings will be made at the assessment form or other suitable form.

- The screening forms will be filed separately.
- The Data recordings will be monitored for completion by HOD and adverse event by Sr.Research Officer (Statistics). All forms will be further scrutinized in presence of Investigators by Sr.Research Officer (Statistics) for logical errors and incompleteness of data to avoid any bias. No modification in the results is permitted for unbiased reports.

STATISTICAL ANALYSIS:

All collected data will be entered into the computer and manually cross-checked the correctness of the data entry. The clinical symptoms and Peak expiratory flow rate (L/min) will be analysed by comparing the two point of data(before and after treatment) paired test and chi-square test will be employed to study the efficacy of treatment. Futher, the effect of age and sex will also be analysed.

OUT COME

Primary Outcome:

Primary Outcome is mainly assessed by comparing the pre and post treatment Peak expiratory flow rate (L/min)

Secondary Outcome:

Secondary outcome is assessed by comparing the following parameters ,before and after the treatment

1) Other Clinical symptoms

2) Eosinophils (%) and ESR

3) Asthma grade level.

ADVERSE EFFECT / SERIOUS EFFECT MANAGEMENT:

If the trial patient develops any adverse reaction, he/she would be immediately withdrawn from the trial and referred to the pharmocovigilance Department of National Institute of Siddha.

ETHICAL ISSUES

1. Informed consent will be obtained from the patient explaining in the understandable language to the patient.

2. After the consent of the patient (through consent form) they will be enrolled in the study

3. Treatment would be provided free of cost.

4. No other external or internal medicines will be used. There will be no infringement on the rights of patient

5. To prevent any infection, while collecting blood sample from the patient, only disposable syringes, disposable gloves, with proper sterilization of lab equipments will be used.

6. The data collected from the patient will be kept confidentially. The patient will be Informed about the diagnosis, treatment and follow-up.

7. The patients who are excluded [as per the exclusion criteria]are given proper treatment, with full care at National Institute of Siddha

8. In conditions of treatment failure, adverse reactions, patients will be given alternative treatment at the National Institute of Siddha with full care throughout the end.

ASSESSMENT FORM:

FORM I SCREENING AND SELECTION PROFORMA

FORM I A HISTORY PROFORMA ON ENROLLMENT

FORM ll CLINICAL ASSESSMENT ON ENROLLMENT

FORM ll A CLINICAL ASSESSMENT DURING AND AFTER TRIAL

FORM lll LABORATORY INVESTIGATION ON ENROLLMENT AND CONCLUSION OF TRIAL

FORM IV A DRUG COMPLIANCE FORM

FORM IV B INFORMATION SHEET

FORM IV C CONSENT FORM

FORM IV D DIETARY ADVICE FORM

FORM IV E WITHDRAWAL FORM

FORM IV F ADVERSE REACTION FOR

OBSERVATION AND RESULTS

Results were observed with respect to the following criteria

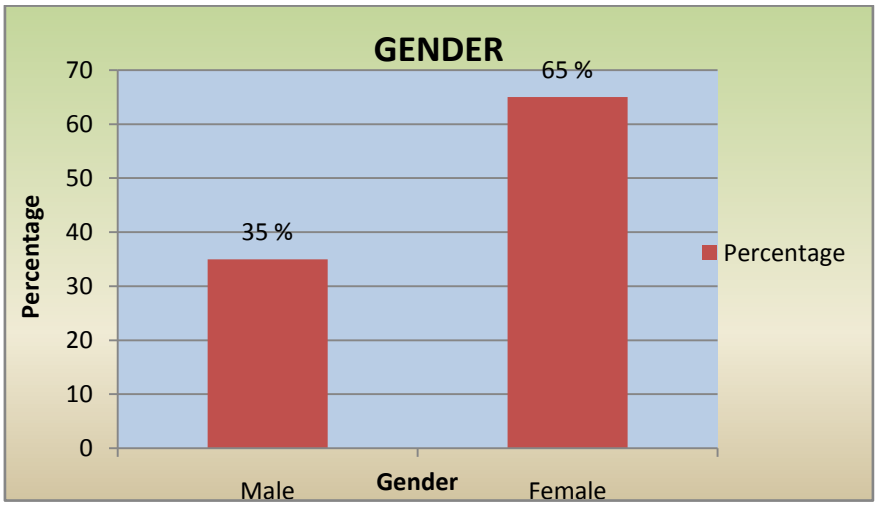
1. Sex Distribution
2. Age Distribution
3. Kaalam Distribution
4. Religion Distribution
5. Thinai Distribution
6. Paruva Kaalam Distribution
7. Occupation Distribution
8. Socio-economic status
9. Triggering factors
10. Clinical features
11. Duration of Illness
12. Family history
13. Diet factor
14. Habits
15. Gnanendhiriyam (Imporigal)
16. Kanmendhiriyam
17. Kosam
18. Mukkutram a)Vadham b)Pitham c) Kabam
19. Ezhu Udal Kattugal
20. Envagai Thervugal
21. Neikuri
22. Laboratory Analysis
23. Primary Outcome
    PeakExpiratoryFlowRate
24. Secondary Outcome
    a. Clinical Features
    b.ESR and Eosinophil count
    c. Grading of asthma.
25. Gradation of Results

For this study 40 cases were selected.

1. GENDER DISTRIBUTION

TABLE NO: 1

GENDER	No. Of Cases	Percentage (%)
Male	14	35%
Female	**26**	**65%**
TOTAL	40	100



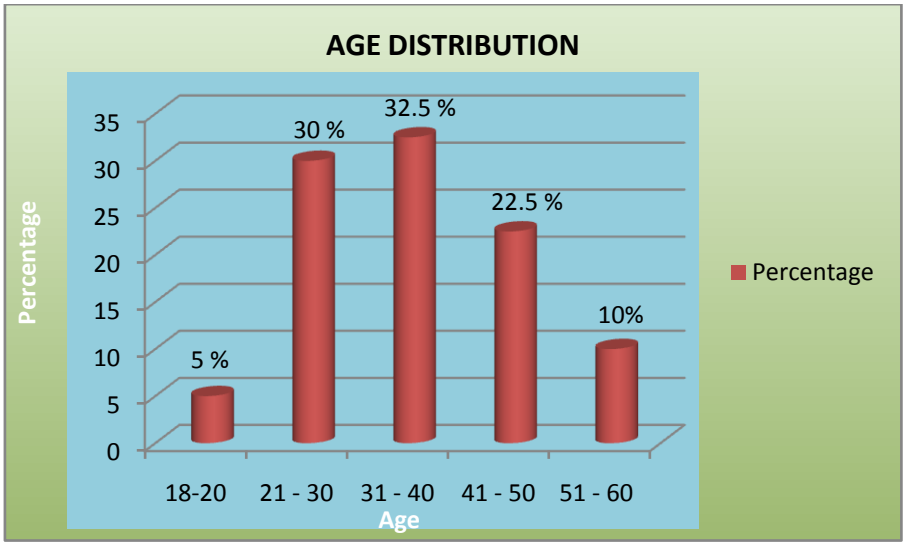
Inference: Out 40 cases, **26 cases** (65%) were **Female** and **14 cases** (35%) were **Male.**

It is clear that the incidence of asthma is more in Female.

2. AGE DISTRIBUTION

TABLE NO: 2

S.NO	Age in years	No. Of Cases	Percentage (%)
1.	18-20	2	5
2.	21-30	**12**	**30**
3.	31-40	**13**	**32.5**
4.	41-50	9	22.5
5.	51-60	4	10
	TOTAL	40	100

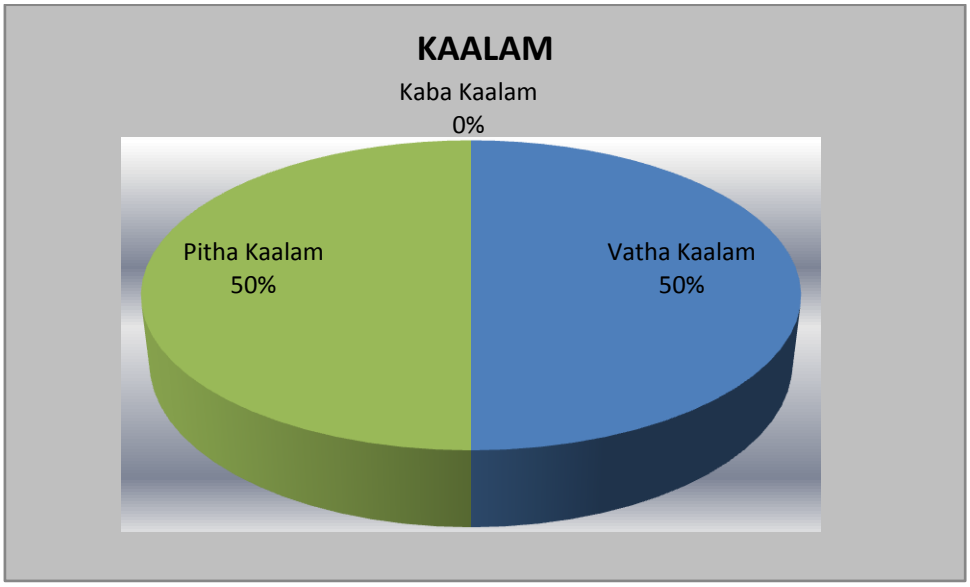


Inference: Out 40 cases, **2cases** (5%) were in the age group between **18-20**, 12 cases (30%) were in the age group between **21-30%**, 13 cases (32.5%) were in the age group between **31-40** , 9 cases(22.5%) were in the age group between **41-5**,4 cases (10%) were in the age group between 51-60.

3. DISTRIBUTION OF CASES BY KAALAM. (LIFE SPAN)

TABLE NO: 3

Kaalam	No. Of Cases	Percentage (%)
Vatha Kaalam **1 – 33 years**	20	50
Pitha Kaalam **34 – 66 years**	20	50
Kaba Kaalam **67 – 100 years**	0	0
TOTAL	40	100



Inference: Out of 40 cases, **20 of cases** (50%) were found to be affected in their **Vatha kaalam** (Between 1 - 33 years) and 20 of cases (50%) were found to be affected in their **Pitha kaalam** (Between 34-66years).

4. DISTRIBUTION OF CASES BY RELIGION

TABLE NO: 4

S.No	Religion	No. Of Cases	Percentage (%)
1.	Hindus	37	92.5
2.	Christians	3	7.5
3.	Muslims	0	0
	TOTAL	40	100

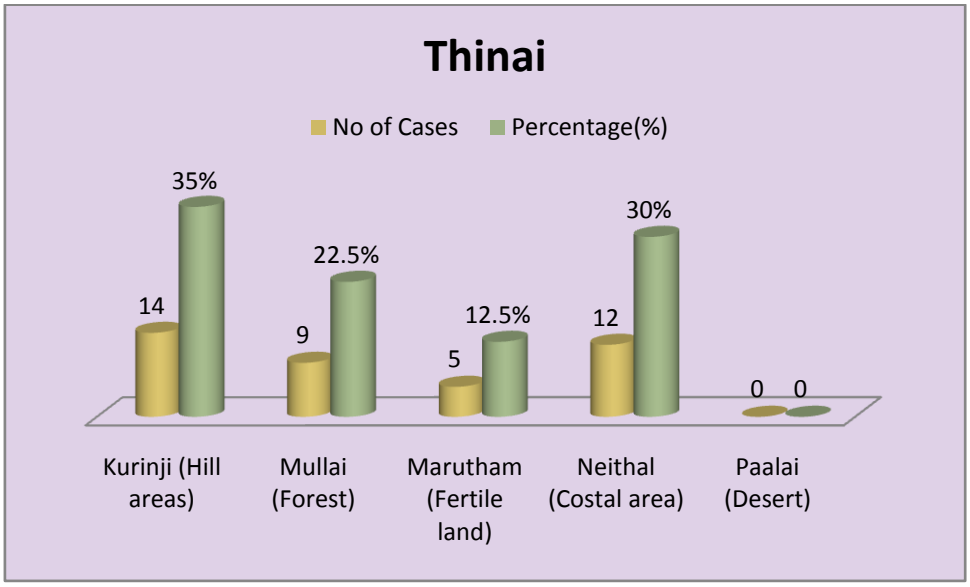
Inference: Out of 40 cases, **37 cases** (92.5%) were **Hindu**, 3 cases (7.5%) were Christians.

5. DISTRIBUTION OF CASES BY THINAI (LAND)

TABLE NO: 5

Thinai (Land)	No. Of Cases	Percentage(%)

Kurinji (Hill areas)	**14**	**35**
Mullai (Forest)	9	22.5
Marutham (Fertile land)	5	12.5
Neithal (Costal area)	**12**	**30**
Paalai (Desert)	0	0
TOTAL	40	100



Inference : Among the 40 cases , **14 cases** (35%) belonged to the kurinji (i.e. Mountains & its surroundings), 9 **cases** (22.5%) belonged to the **Muillai** (i.e. Forest & its surroundings) ,

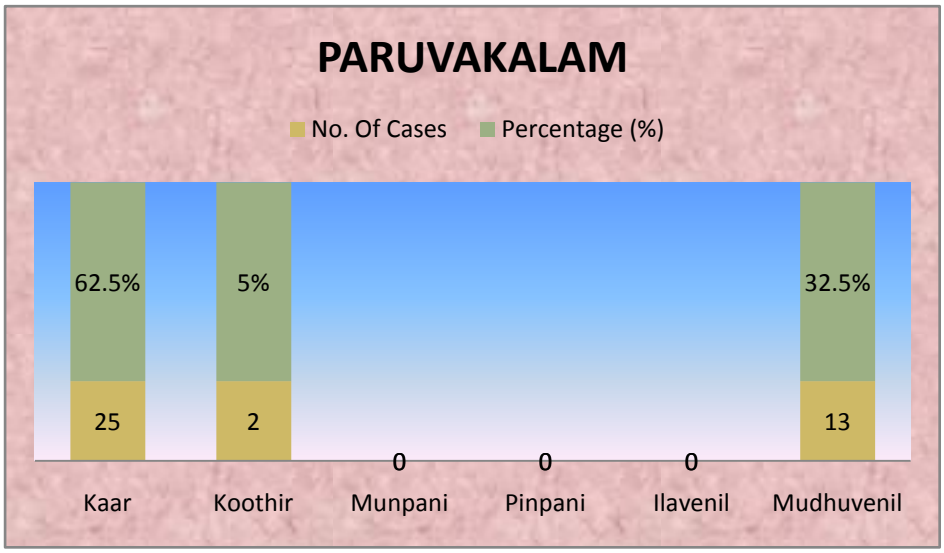
5 cases (12.5%) belonged to the **Marutham** (i.e. plain & its surroundings) and **12 cases** (30%) belonged to the **Neithal**(costal area& its surroundings).

. 6. DISTRIBUTION OF CASES BY PARUVA KAALAM

TABLE NO.6

S. No	Paruva Kaalam	No. Of Cases	Percentage (%)

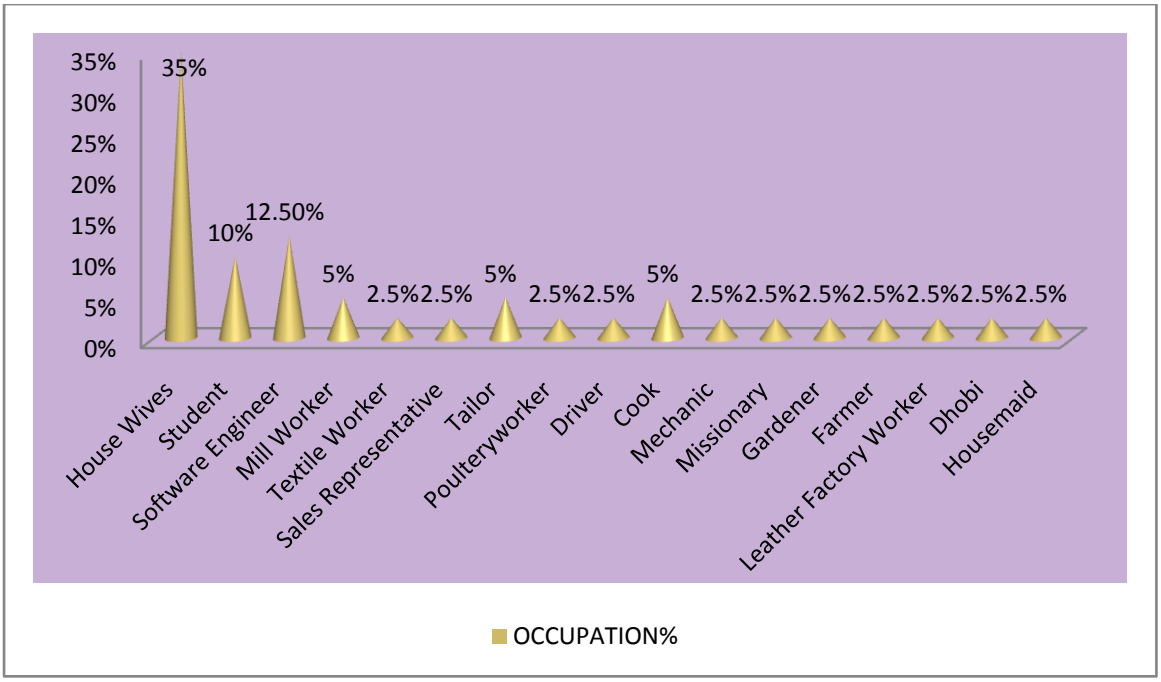
1.	Kaar (Aug 16 – Oct 15)	**25**	**62.5**
2.	Koothir (Oct 16 – Dec 15)	2	5
3.	Munpani (Dec 16 – Feb 15)	0	0
4.	Pinpani (Feb 16 – Apr 15)	0	0
5.	Ilavenil (Apr 16 – Jun 15)	0	0
6.	Mudhuvenil (Jun 16 –Aug15)	**13**	**32.5**



Observation : Among the 40 cases, in 25 cases (62.5%) the incidence of the disease seems to be higher **kaar kalam**(Aug 16 – Oct 15) , in 13 cases(32.5%) the incidence occurred in **Mudhuvenil** (Jun 16 –Aug15) and , in 2 cases(5%) the incidence occurred in **koothir kaalam**(Oct 16-Dec15)

7. OCCUPATIONAL DISTRIBUTION
TABLE NO.7

S. No	Occupation	No. Of Cases	Percentage(%)
1	House Wives	**14**	**35**
2	Student	4	10
3	Software Engineer	**5**	**12.5**
4	Mill Worker	2	5
5	Textile Worker	1	2.5
6	Sales Representative	1	2.5
7	Tailor	2	5
8	Poultery worker	1	2.5
9	Driver	1	2.5
10	Cook	2	5
11	Mechanic	1	2.5
12	Missionary	1	2.5
13	Gardener	1	2.5
14	Farmer	1	2.5
15	Leather Factory Worker	1	2.5
16	Dhobi	1	2.5
17	Housemaid	1	2.5



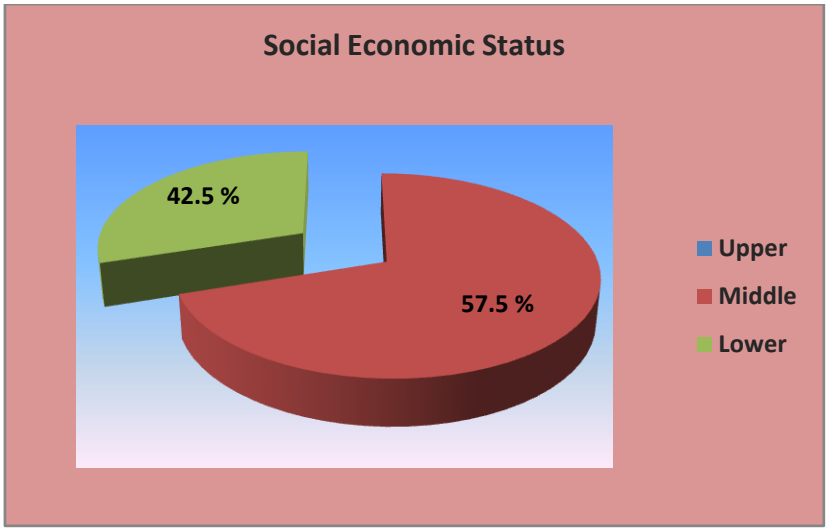
Observation : Out of 40 cases,**14**cases(**35%)** were **House wives**,4 cases(**10%) Students**,

5 cases(**12.5%**) were **Software Engineers**, 2 cases(**5%)** were **cook**, Tailor,Mill worker and remainding cases 2.5% of the cases were Gardener, Texile worker,Sales representative, Poultery worker, Diver,Leather Factory worker ,Mechanic,missionary,Farmer,Dhobi and Housemaid.

8. SOCIO ECONOMIC STATUS DISTRIBUTION

TABLE NO.8

S. No	Socio - Economic Status	No. Of Cases	Percentage(%)
1.	Upper	0	0
2.	Middle class	**23**	**57.5**
3.	Lower	17	42.5
	Total	40	100



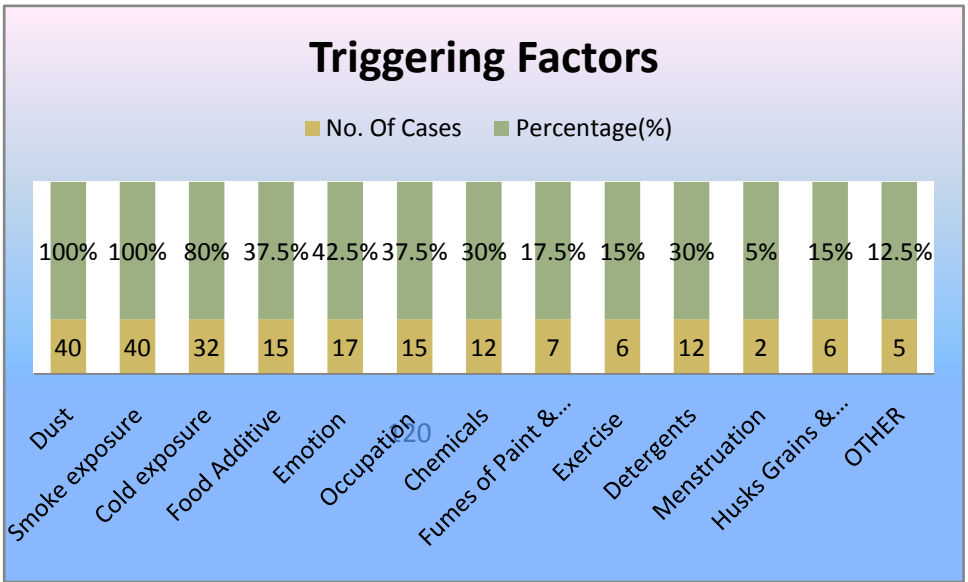
Observation : The incidence of the disease was found to be higher in 23(57.5%) cases belonging to middle class and in 17(42%) cases belonging to economically lower class

9. DISTRIBUTION OF TRIGGERING FACTORS

TABLE NO.9

S. No	Triggering Factors	No. Of Cases	Percentage(%)
1	Dust	**40**	**100**
2	Smoke exposure	**40**	**100**
3	Cold exposure	**32**	**80**
4	Food Additive	15	37.5
5	Emotion	17	42.5
6	Occupation	15	37.5
7	Chemicals	12	30
8	Fumes of Paint & Petrol	7	17.5
9	Exercise	6	15
10	Detergents	12	30
11	Menstruation	2	5
12	Husks, Grass & Pollens	6	15

13	OTHER	5	12.5



Inference :

Among 40 cases ,the following triggering factor were observed.

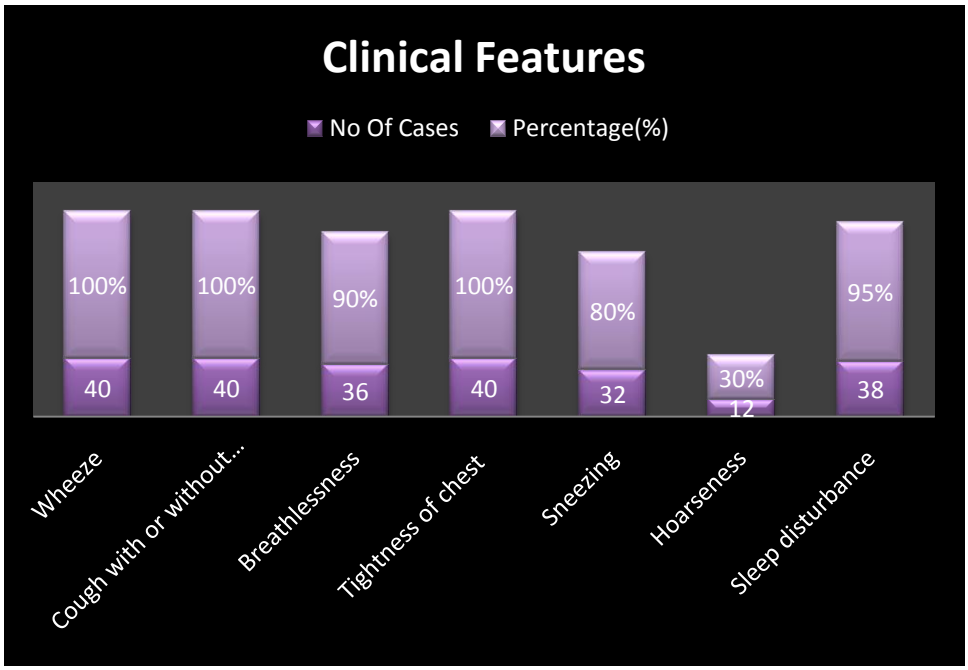
Dust and smoke is a main triggering factor in all 40 cases(100%),cold exposure in 32 cases(80%),food additive in15 cases(37.5%),emotion in17 cases(42.5%),occupation in15cases(37.5%),chemicals in 12 cases(30%),fumes of paints and petrol in7 cases(17.5%),exercise in6 cases(15%),detergent in12 cases(30%), menstruation in 2cases(5%),husks, grains and pollens in 6 cases(15%) and other surrounding environment factor in 5 cases(12.5%).

10. CLINICAL FEATURES (B T)

TABLE NO: 10

S. No	Clinical Features	No Of Cases	Percentage(%)

1	Wheeze	**40**	**100**
2	Cough with or without expectoration	**40**	**100**
3	Breathlessness	36	90
4	Tightness of chest	**40**	**100**
5	Sneezing	**32**	**80**
6	Hoarseness	12	30
7	Sleep disturbance	38	95



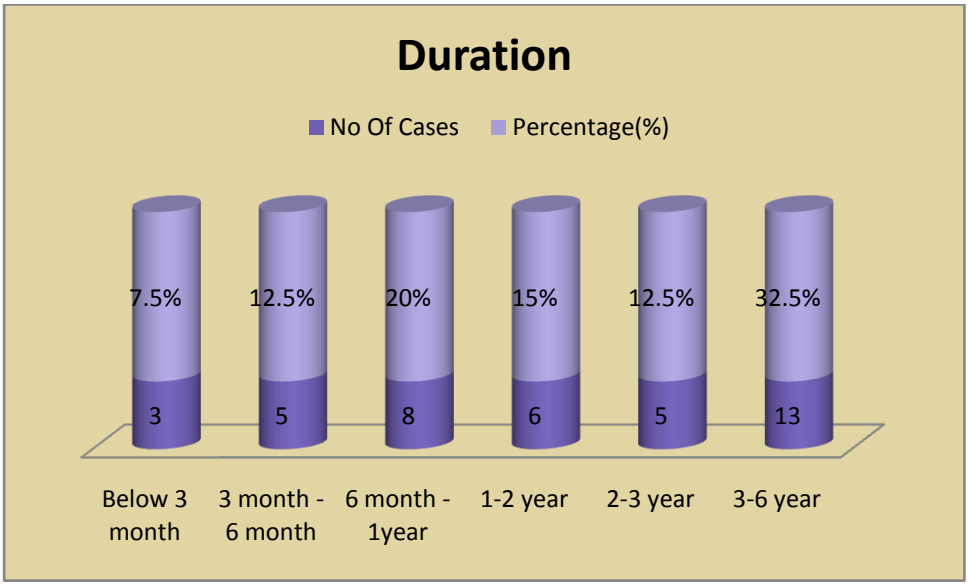
Inference: Among 40 cases, in all the **40 cases** (100%) had **wheezing, cough,tightness of chest,36cases (90%) had breathlessness, 38 cases(95%) had Sleep disturbance**, **32 cases** (80%) had **sneezing** and **12 cases (30%)** had **hoarseness**.

11. DISTRIBUTION OF CASES BY DURATION OF ILLNESS

TABLE: 11

S. No	Duration	No Of Cases	Percentage(%)
1	Below 3 month	3	7.5

2	3 month -6 month	5	12.5
3	6 month -1year	8	20
4	1-2 year	6	15
5	2-3 year	5	12.5
6	3-6 year	**13**	**32.5**



Inference:

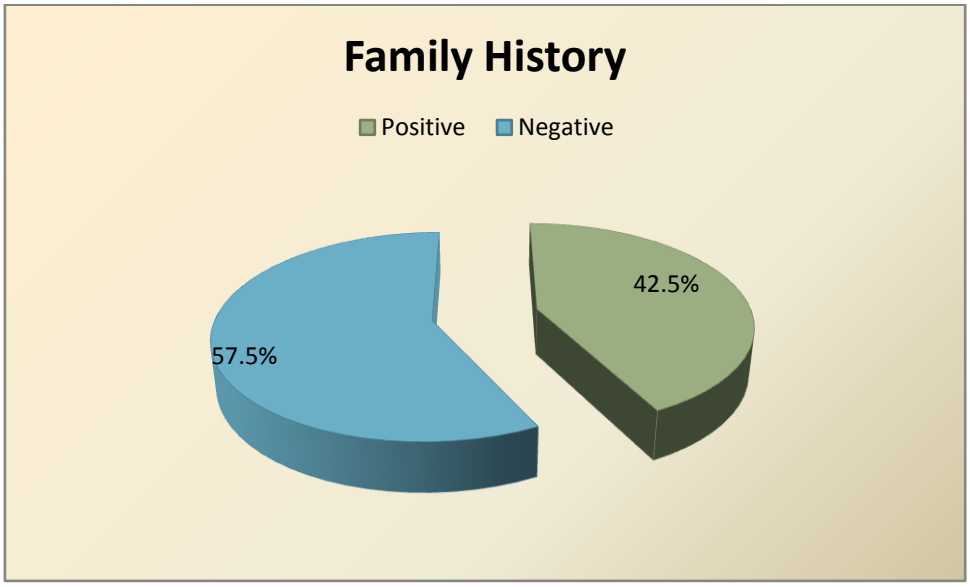
Out of 40 cases, **13 cases** (32.5%) were affected by the illness from **3-6 year**,**6cases**

(12.5%) were affected by the illness from **1-2year**, **5 case** (12.5%) were affected by the illness from **2-3year**, **8cases** (20%) were affected by the illness from **6 months-1year**, **5 cases** (12.5%) were affected by the illness from **3-6 months** and **3case** (7.5%) were affected by the illness from below **3 months.**

12. FAMILY HISTORY

TABLE NO.12

S.No	Family History	No Of cases	Percentage (%)
1.	Positive	17	42.5
2.	Negative	**23**	**57.5**



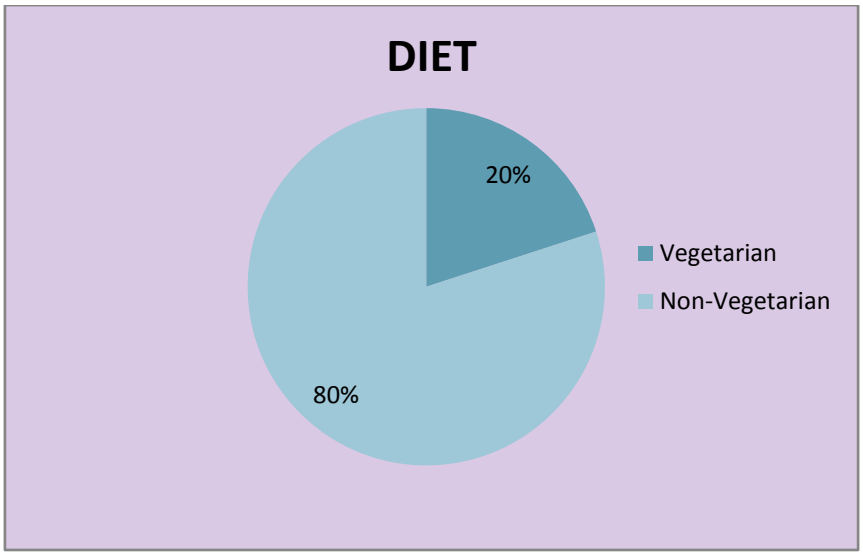
Inference:

Among 40 cases, **23 cases** (57.5%) reported **Negative family history** of similar illness and **17cases** (42.5%) reported **Positive family history** of similar illness.

13. DIET

TABLE NO: 13

S.No	Diet	No Of cases	Percentage (%)
1	Vegetarian	8	20
2	Non-Vegetarian	**32**	**80**



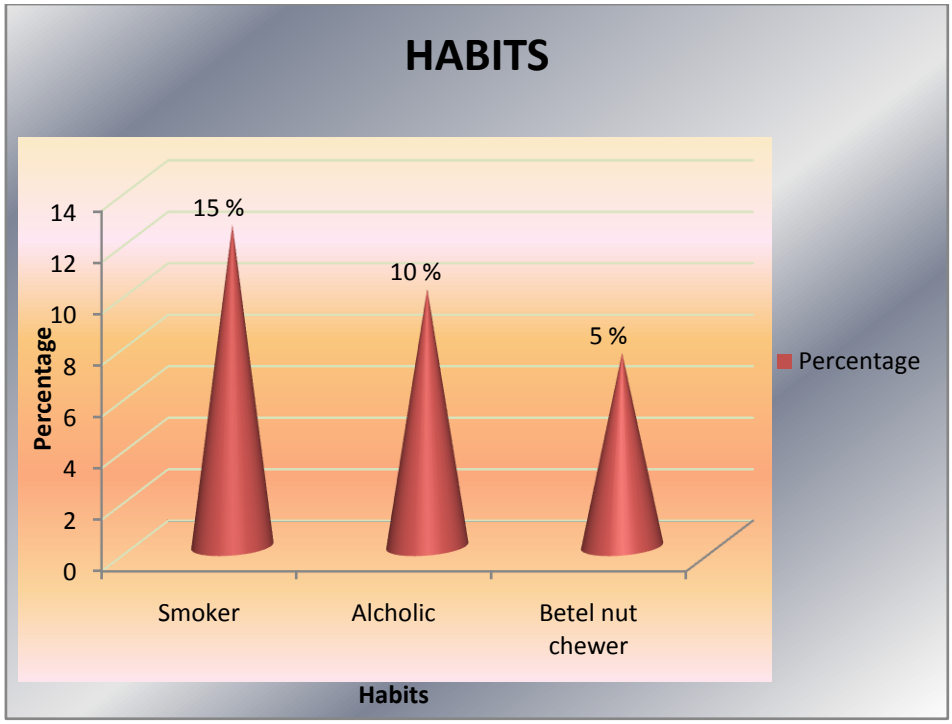
Inference:

Among 40 cases, **32 cases** (80%) had taken **Non-Vegetarian**; remaining 8 **cases** (20%) were **vegetarian**.

14. Habits

TABLE NO: 14

S. No	Habits	No Of cases	Percentage (%)
1.	Smoker	**6**	**15**
2.	Alcoholic	4	10
3.	Betel nut chewer	2	5



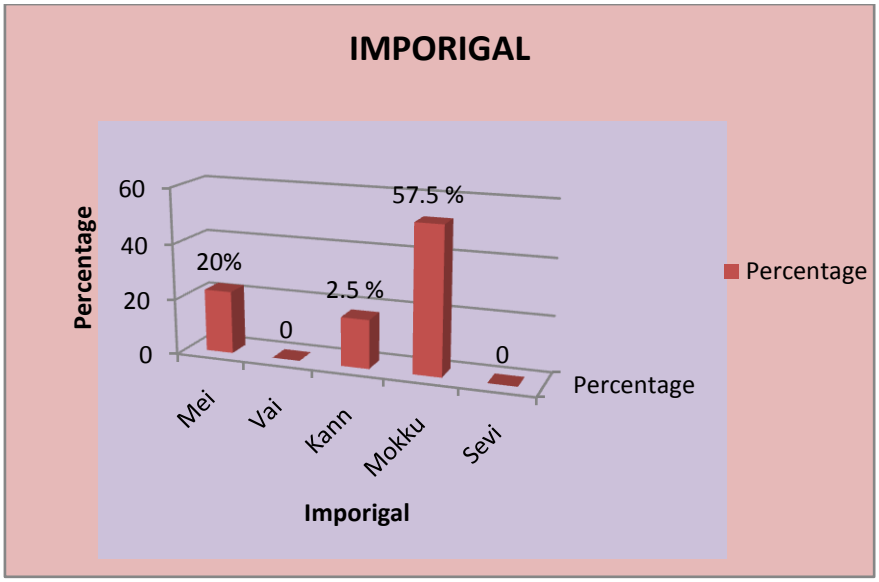
Inference :

Out of 40 cases, **6cases** (15%) were **smokers**, **4 cases** (10%) were **Alcoholi**c and **2cases** (5%) were **Betel nut chewer.**

15. IMPORIGAL

TABLE NO : 15

S.No	Imporigal	No of Cases	Percentage%
1.	Mei	8	20
2.	Vai	0	0
3.	Kann	5	12.5
4.	Mooku	**23**	**57.5**
5.	Sevi	0	0



Inference: Among 40 cases, **Mookku** was affected in **23 cases** (57.5%) due to running nose and nasal block. **Mei** was affected in **8 cases** (20%) due to pain in upper lower limbs and **Kan** was affected in **5 cases** (12.5%) due to diminished vision.

16. KANMENDHIRIYAM

TABLE NO: 16

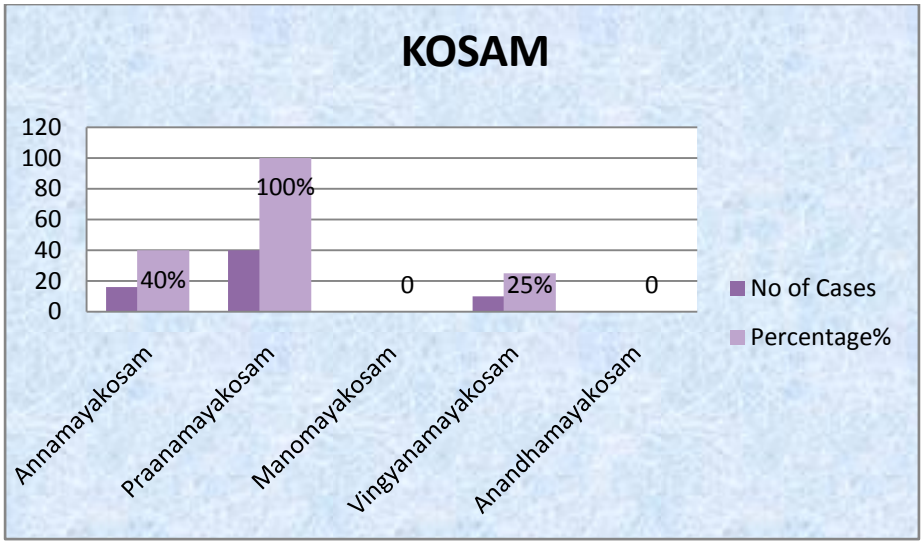
S.No	Kanmendhiriyam	No of Cases	Percentage%
1.	Kai	4	10
2.	Kaal	**6**	**15**
3.	Vai	0	0
4.	Eruvai	3	7.5
5.	Karuvai	0	0

S.NO	KOSANGAL	No of Cases	Percentage%
1	Annamayakosam	16	40
2	Praanamayakosam	**40**	**100**
3	Manomayakosam	0	0
4	Vingyanamayakosam	10	25
5	Anandhamayakosam	0	0

Inference: Among 40 cases, Kai was affected in4cases (10%) , Kaal was affected in 6 cases(15%)which resulted in pain in upper and lower limbs. Eruvai was affected in3 cases(7.5%) which resulted in constipation.

17.KOSANGAL

TABLE NO: 17



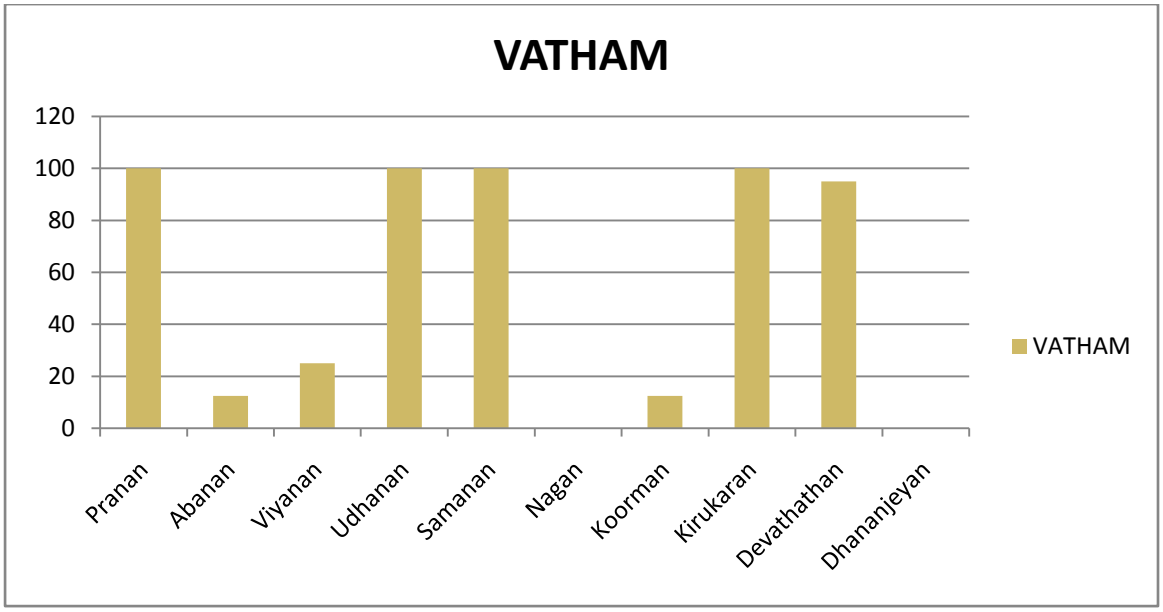
Inference: Among 40 cases, **Pranamayakosam** was affected in all 40cases(100%) which resulted in breathlessness,cough,wheeze and tightness of chest. **Annamayakosam** was affected in 16 cases (40%) which resulted in indigestion, and **Vingyanamayakosam** was affected in 10 cases(25%).

In Swasa kasam Pranamayakosam was mainly affected

18.MUKKUTRAM a. VATHAM b. PITHAM c. KABAM

18 a. VATHAM - TABLE NO: 18a

S.No	Types of Vatham	No of Cases	Percentage%
1.	Pranan	**40**	**100**
2.	Abanan	5	12.5
3.	Viyanan	10	25
4.	Udhanan	**40**	**100**
5.	Samanan	**40**	**100**
6.	Nagan	0	0
7.	Koorman	5	12.5
8.	Kirukaran	**40**	**100**
9.	Devathathan	38	95
10.	Dhananjeyan	0	0

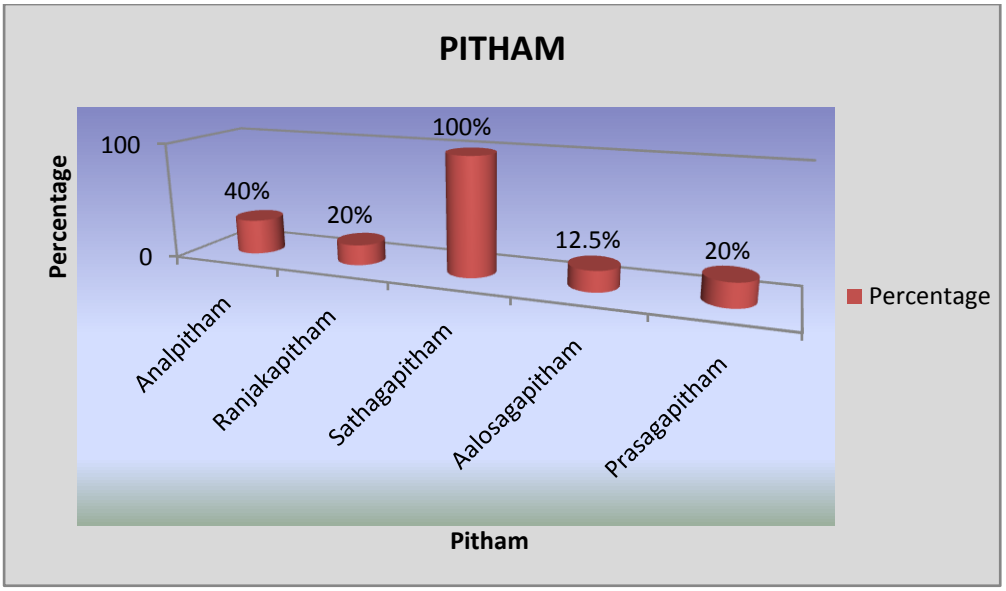


Inference: Out of 40 cases observed , Pranan was affected in 40 cases(100%) which resulted in breathlessness, cough, wheeze , Abanan was affected in 5 cases(12.5%) which resulted in constipation, burning micturation, Udhanan was affected in 40 cases(100%) low which resulted in pitched voice, Viyanan was affected in 10 patients (25%) which resulted in pain in lower limbs, Koorman was affected in5 cases (12.5%) which resulted in excessive lacrimation and diminished vision, Kirukaran was affected in 40 cases which resulted in excessive cough reflex, excessive sneezing reflex and Dhevathathan was affected in 38 cases (95%) which resulted in tiredness.

18 b. PITHAM

TABLE NO: 18b

S.No	Types of Pitham	No of Cases	Percentage%
1.	Analpitham	16	40
2.	Ranjakapitham	8	20
3.	Sathagapitham	**40**	**100**
4.	Aalosagapitham	5	12.5
5.	Prasagapitham	8	20

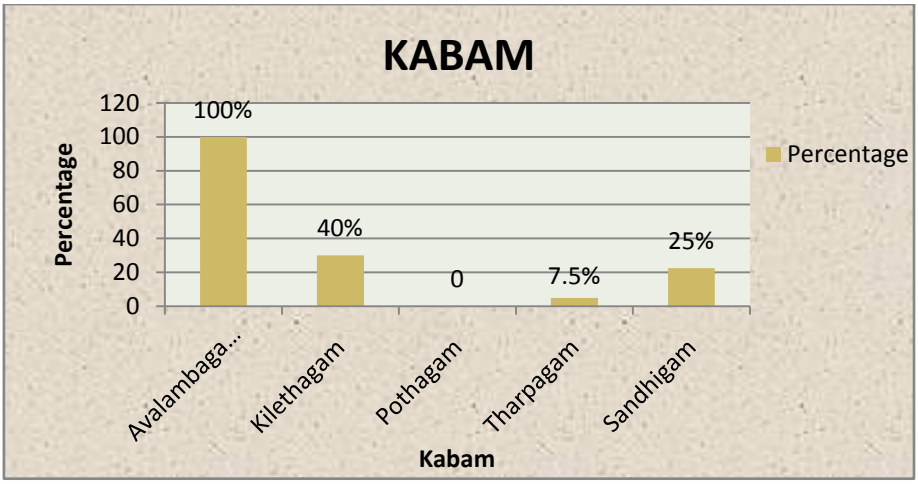


Inference: Sadhaga pitham was affected in all 40 cases (100%), Anal pitham was affected in 16 cases (40%) which resulted in indigestion ,poor appetite, Prasagapitham was affected in 8 cases (20%) which resulted in lesions in any part of the body and pallor, Aalosaga pitham was affected in 5 cases (12.5%) which resulted in dimnished vision and Ranjakapitham was affected in 8cases (20%) which resulted in pallor .

18 c. KABAM

TABLE NO : 18c

S.No	Types of Kabam	No of Cases	Percentage%
1.	Avalambagam	**40**	**100**
2.	Kilethagam	16	40
3.	Pothagam	0	0
4.	Tharpagam	3	7.5
5.	Sandhigam	10	25

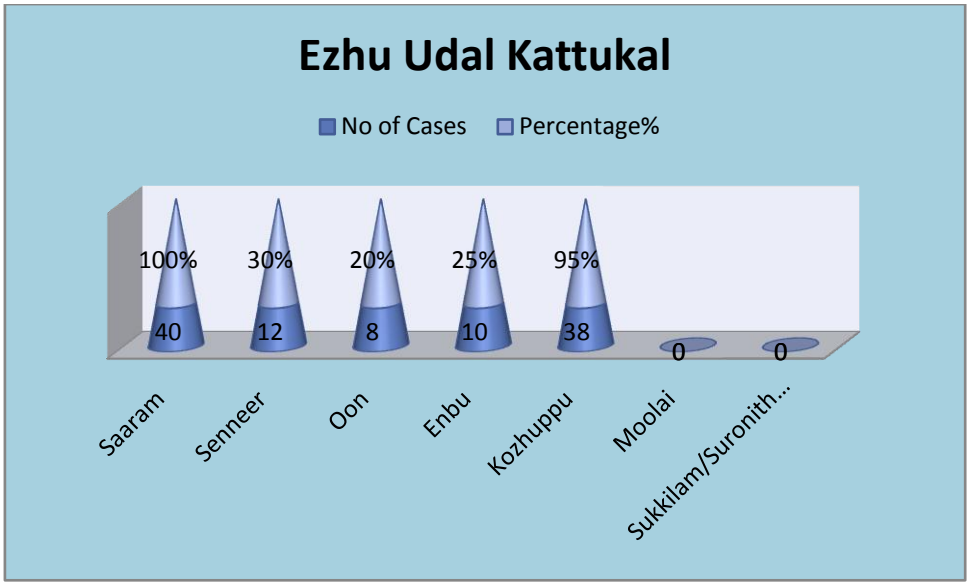


Inference: Avalambagam was affected in all the 40 cases(100%) which resulted in the presence of tightness of chest, cough, wheezing and breathlessness. Sandhigam was affected in 10 cases(25%) which resulted in joints pain and Kilethagam was affected in 16 cases (40%) which resulted in loss of appetite and Tharpagam was affected in 3 cases (7.5%) which resulted in burning sensation of eyes.

19.EZHU UDAL KATTUKAL

TABLE NO : 19

S.No	Ezhu Udal Kattukal	No of Cases	Percentage%
1	Saaram	**40**	**100**
2	Senneer	12	30
3	Oon	8	20
4	Enbu	10	25
5	Kozhuppu	**38**	**95**
6	Moolai	0	0
7	Sukkilam/Suronitham	0	0



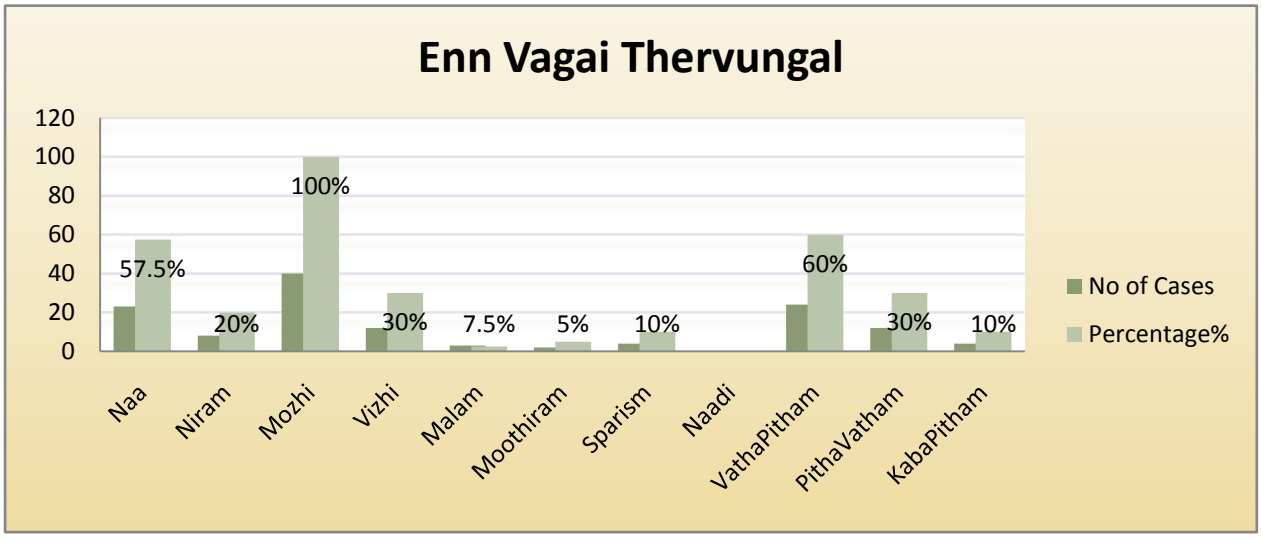
Inference: Saram was affected in all cases 40 (100%), Senneer was affected in 12 cases (30%) which resulted in pallor ,Oon was affected in 8 cases (20%) which resulted in joints pain,Kozhuppu was affected in 38cases(95%) which resulted in body pain,Ennbu was affected in10 cases(25%) which resulted in joint pain.

20. ENN VAGAI THERVUGAL

TABLE NO : 20

S.No	Enn Vagai Thervugal	No of Cases	Percentage%
1	Naa	23	57.5
2	Niram	8	20
3	Mozhi	40	100
4	Vizhi	12	30
5	Malam	3	7.5
6	Moothiram	2	5
7	Sparism	4	10
8	Naadi		
	VathaPitham	24	60

	PithaVatham	12	30
	KabaPitham	4	10



Inference:

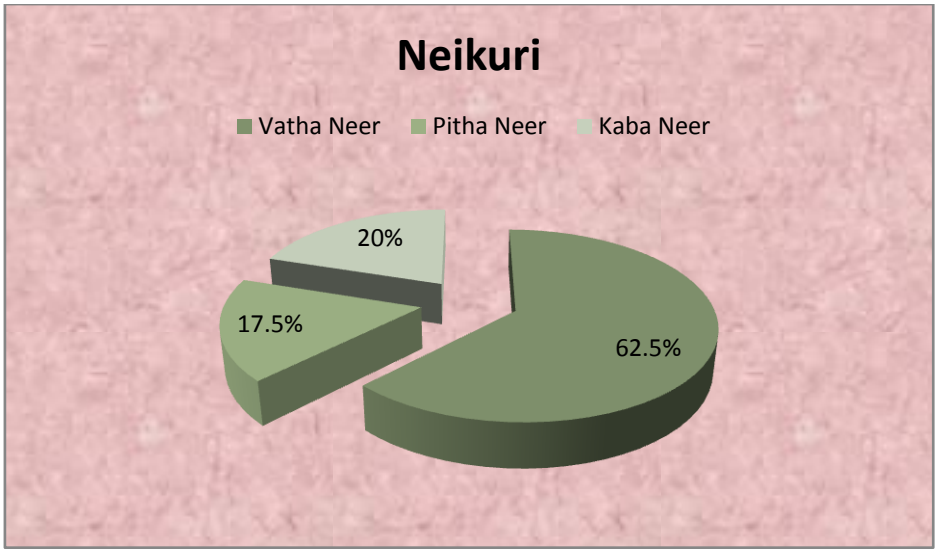
- **Mozhi** was affected in all **40 cases** (100%) which resulted in low pitched voice and difficulty in speech,
- **Naa** was affected in **23cases** (57.5%) which resulted in coated tongue, pallor tongue, tongue ulcer,
- **Vizhi** was affected in **12 cases** (30%) which resulted in diminished vision, pallor, itching,
- **Niram** was affected in **8 cases** (20%) which resulted in skin lesions,
- **Malam** was affected in **3 cases** (7.5%) which resulted in constipation,
- **Sparisam** was affected in **4 cases** (10%) of the patients which resulted in sweating
- **Moothiram** was affected in **2 cases** (5%) which resulted in burning micturition.

In Swasa kasam Mozhi was affected in all the patients. Naa, Niram, Malam, Sparism, Vizhi, were affected in most of the patients. In Naadi Vathapitha naadi showed higher frequency than the others.

21. NEIKURI

TABLE NO – 21

S.No	Neikuri	No of Cases	Percentage%
1	Vatha Neer	25	62.5
2	Pitha Neer	7	17.5
3	Kaba Neer	8	20



Inference: Among 40 patients, **25 cases** (62.5%) of the patients had **Vadha neer**(Snake Pattern), **7 cases**(17.5%)of the patients had **Pitha neer**(Ring Pattern) and **8 cases**(20%) of the patients had **kapha neer** (Pearl Pattern).

In majority of cases Vatha neer was present.

INVESTIGATIONS

PEAK EXPIRATORY FLOW RATE

S.No	O.P/I.P No.	Age/Sex	PEFR(lit/min) B.Treatment	PEFR(lit/min)A.Treatment
1.	C80516	40/F	130	180
2.	C80591	20/F	120	250
3.	C79343	21/F	150	190
4.	C80968	25/F	130	280
5.	C83148	29/F	100	260
6.	4983	29/M	180	360
7.	C83357	29/F	180	320
8.	C83859	21/F	150	210
9.	C84354	23/F	160	280
10.	C84952	46/M	210	380
11.	C85576	34/F	170	280
12.	C85444	40/F	160	290
13.	C85401	28/F	150	200
14.	C86528	38/M	230	410
15.	C87290	42/F	110	180
16.	C87412	40/M	210	360

17.	C87563	52/F	140	270
18.	C89103	55/M	180	260
19.	C92628	32/M	160	310
20.	4077	33/F	130	340
21.	C89542	42/F	180	290
22.	C90031	25/M	250	420
23.	C90298	30/M	210	370
24.	C93882	44/F	110	240
25.	C88940	33/F	160	250
26.	C92056	26/M	190	350
27.	C91895	18/F	180	290
28.	C91493	28/M	210	340
29.	4043	35/F	180	360
30.	C94291	21/M	170	340
31.	C87827	32/F	190	290
32.	B73595	43/M	210	240
33.	4254	47/F	160	310
34.	4147	46/F	190	360
35.	5120	54/M	230	430
36.	D001578	32/F	130	280
37.	4206	55/F	180	230
38.	4202	31/F	160	280
39.	5184	37/M	220	250
40.	4205	40/F	150	320

EOSINOPHILS COUNT BEFORE AND AFTER TREATMENT

S.No	O.P/I.P No.	Age/Sex	Eosinophil%B T	Eosinophil%A T
1.	C80516	40/F	5	3
2.	C80591	20/F	6	2
3.	C79343	21/F	7	4
4.	C80968	25/F	7	2
5.	C83148	29/F	5	2
6.	4983	29/M	10	6
7.	C83357	29/F	5	2
8.	C83859	21/F	14	6
9.	C84354	23/F	4	2
10.	C84952	46/M	6	5
11.	C85576	34/F	10	4
12.	C85444	40/F	8	3
13.	C85401	28/F	4	3
14.	C86528	38/M	6	2
15.	C87290	42/F	5	1
16.	C87412	40/M	8	3
17.	C87563	52/F	4	1
18.	C89103	55/M	7	2

19.	C92628	32/M	9	4
20.	4077	33/F	4	1
21.	C89542	42/F	5	2
22.	C90031	25/M	7	3
23.	C90298	30/M	6	3
24.	C93882	44/F	1	1
25.	C88940	33/F	3	1
26.	C92056	26/M	5	3
27.	C91895	18/F	7	5
28.	C91493	28/M	5	2
29.	4043	35/F	3	1
30.	C94291	21/M	6	4
31.	C87827	32/F	4	2
32.	B73595	43/M	5	3
33.	4254	47/F	4	2
34.	4147	46/F	10	3
35.	5120	54/M	6	1
36.	D001578	32/F	5	2
37.	4206	55/F	7	3
38.	4202	31/F	9	6
39.	5184	37/M	3	1
40.	4205	40/F	5	3

ESR RATE BEFORE AND AFTER TREATMENT

S.No	O.P/I.P No.	Age/Sex	ESR(mm/hr) BT		ESR(mm/hr) AT	
			½ hrs	1hrs	½ hrs	1 hrs
1.	C80516	40/F	2	8	2	4
2.	C80591	20/F	4	10	2	6
3.	C79343	21/F	4	12	4	8
4.	C80968	25/F	4	10	2	4
5.	C83148	29/F	6	16	4	12
6.	4983	29/M	4	10	2	6
7.	C83357	29/F	10	24	6	14
8.	C83859	21/F	4	8	2	6
9.	C84354	23/F	8	6	4	2
10.	C84952	46/M	6	10	2	6
11.	C85576	34/F	8	18	2	8
12.	C85444	40/F	6	8	4	6
13.	C85401	28/F	4	12	2	8
14.	C86528	38/M	2	4	2	4
15.	C87290	42/F	2	6	2	4
16.	C87412	40/M	4	8	2	6
17.	C87563	52/F	8	26	6	18
18.	C89103	55/M	6	8	2	6
19.	C92628	32/M	4	8	2	4
20.	4077	33/F	8	18	4	8

21.	C89542	42/F	6	14	4	6
22.	C90031	25/M	6	10	2	4
23.	C90298	30/M	2	6	2	4
24.	C93882	44/F	4	12	2	8
25.	C88940	33/F	4	10	2	4
26.	C92056	26/M	6	8	2	4
27.	C91895	18/F	4	8	2	4
28.	C91493	28/M	10	24	8	14
29.	4043	35/F	8	10	4	6
30.	C94291	21/M	2	6	2	4
31.	C87827	32/F	4	12	2	8
32.	B73595	43/M	6	8	4	6
33.	4254	47/F	4	10	2	4
34.	4147	46/F	2	12	2	8
35.	5120	54/M	8	30	4	24
36.	D001578	32/F	12	26	8	16
37.	4206	55/F	8	12	4	6
38.	4202	31/F	12	30	8	22
39.	5184	37/M	2	8	2	6
40.	4205	40/F	8	16	6	10

Grading of Asthma:

S.No	O.P/I.P No.	Age/Sex	Grading of asthma BT	Grading of asthma AT
1.	C80516	40/F	2	0
2.	C80591	20/F	3	0
3.	C79343	21/F	2	2
4.	C80968	25/F	3	0
5.	C83148	29/F	1	0
6.	4983	29/M	4	0
7.	C83357	29/F	3	1
8.	C83859	21/F	1	0
9.	C84354	23/F	2	0
10.	C84952	46/M	3	0
11.	C85576	34/F	2	0
12.	C85444	40/F	3	1
13.	C85401	28/F	2	0
14.	C86528	38/M	2	0
15.	C87290	42/F	3	0
16.	C87412	40/M	2	0
17.	C87563	52/F	2	0
18.	C89103	55/M	3	1
19.	C92628	32/M	3	1
20.	4077	33/F	4	0
21.	C89542	42/F	3	1
22.	C90031	25/M	1	0
23.	C90298	30/M	2	0
24.	C93882	44/F	3	1
25.	C88940	33/F	2	0
26.	C92056	26/M	4	1

27.	C91895	18/F	4	0
28.	C91493	28/M	3	1
29.	4043	35/F	4	0
30.	C94291	21/M	3	1
31.	C87827	32/F	4	0
32.	B73595	43/M	2	1
33.	4254	47/F	3	0
34.	4147	46/F	3	0
35.	5120	54/M	2	0
36.	D001578	32/F	3	0
37.	4206	55/F	2	0
38.	4202	31/F	2	0
39.	5184	37/M	4	2
40.	4205	40/F	2	0

Grading of Asthma : 0 - None; 1 - Intermittent, 2-Mild; 3 - Moderate; 4 - Severe

- None: No day and Night symptoms.
- Intermittent :Daytime symptoms<once a week, Night symptoms-rare
- Mild-Daytime symptoms>once a week, Night symptoms-occasional
- Moderate- Daytime symptoms daily, Night symptoms-weekly
- Severe –Daytime symptoms daily ,Night symptoms-frequent

PEAK EXPIRATORY FLOW RATE IMPROVEMENT RATTINGS AFTER TREATMENT 100 and above 100 in (lit/min)

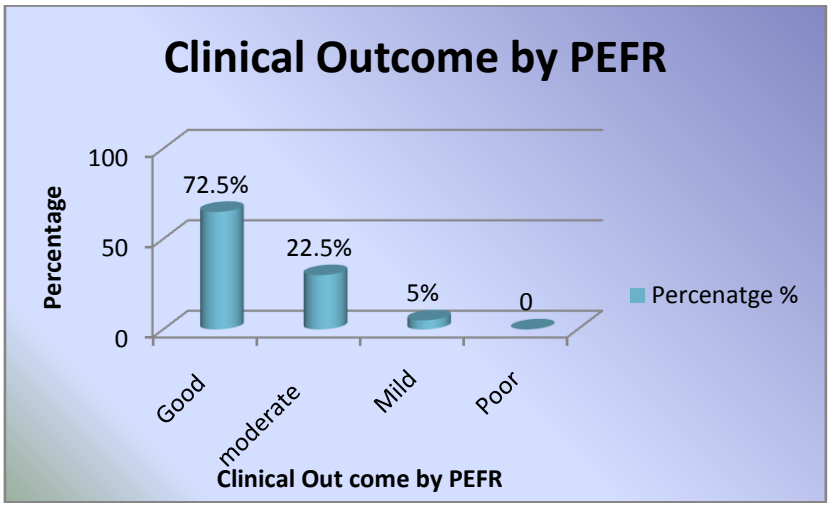
S.No	O.P/I.P No.	Age/Sex	PEFR(lit/min) B.Treatment	PEFR(lit/min)A.Treatment	Improvement(AT)
1	C80591	20/F	120	250	130
2	C80968	25/F	130	280	150
3	C83148	29/F	100	260	160
4	4983	29/M	180	360	180
5	C83357	29/F	180	320	140
6	C84354	23/F	160	280	120
7	C84952	46/M	210	380	170
8	C85576	34/F	170	280	110
9	C85444	40/F	160	290	130
10	C86528	38/M	230	410	180
11	C87412	40/M	210	360	150
12	C87563	52/F	140	270	130
13	C92628	32/M	160	310	150
14	4077	33/F	130	340	210
15	C89542	42/F	180	290	110
16	C90031	25/M	250	420	170
17	C90298	30/M	210	370	160
18	C93882	44/F	110	240	130
19	C92056	26/M	190	350	160

20	C91895	18/F	180	290	110
21	C91493	28/M	210	340	130
22	4043	35/F	180	360	180
23	C94291	21/M	170	340	170
24	4254	47/F	160	310	150
25	4147	46/F	190	360	170
26	5120	54/M	230	430	200
27	D001578	32/F	130	280	150
28	4202	31/F	160	280	120
29	4205	40/F	150	320	170

PRIMARY OUT COME:

CLINICAL OUT COME BY PEFR (OBJECTIVE PARAMETERS)

S.No	Result	No. of cases	Percentage (%)
1	Good	29	72.5
2	Moderate	9	22.5
3	Mild	2	5
4	Poor	0	0



Out of 40 cases as per PEFR ,29 cases (**72.5%)** showed clinically **good** improvement,9 cases(**22.5%**) were **moderately improved** and 2 cases(**5%**)

were **mildly improved**.

Good – PEFR value increased 100 and above 100

Moderate – PEFR value increased 50 - below100.

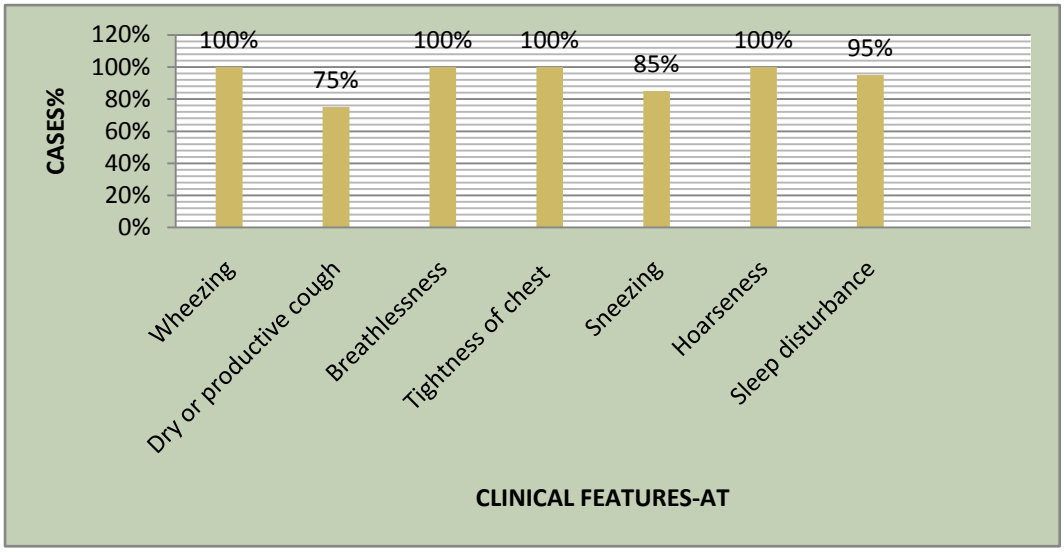
Mild – PEFR value increased 10 – below 50.

Poor – No change in PEFR value.

24. SECONDARY OUT COME

TABLE NO – 24 CLINICAL FEATURES (AT)

S. No	Clinical Features (AT)	No of cases	Percentage (%)
1	Wheezing	100	100
2	Dry or productive cough	30	75
3	Breathlessness	100	100
4	Tightness of chest	100	100
5	Sneezing	34	85
6	Hoarseness	100	100
7	Sleep disturbance	38	95



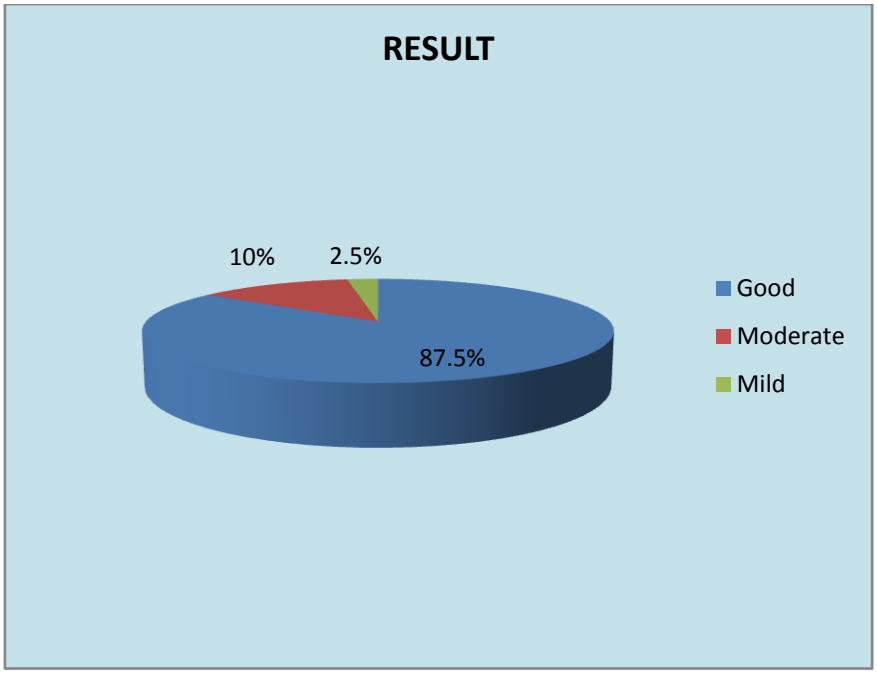
As per subjective parameters (Clinical symptoms)

Among 40 cases, all 40 cases(100%) of were relieved from breathlessness, tightness of chest and hoarseness,34cases(85%) were relieved from sneezing,30 cases(75%)were relieved from cough and38cases(95%) were relieved from Sleep disturbance.

25. GRADATION OF RESULTS

TABLE - 25

S.No	Result	After treatment	
		No Of Cases	Percentage (%)
1.	Good	35	87.5
2.	Moderate	4	10
3.	Mild	1	2.5



Inference :

Out of 40 cases, **Good improvement** were observed in **35(87.5%)** of cases, **Moderate improvement** were observed in 4 cases(10%) and onlyone case had Mild **improvement** 1 cases(2.5%).

STATISTICAL ANALYSIS

Paired 't' test was used to test the significance of treatment using before and after treatment data on PEFR ,Clinical symptoms, Eosinophil and ESR.,Grading of asthma.

The level of significance probability 0.05 was used to test the treatment difference and the values are statistically significant.

Paired 't' test for Peak Expiratory Flow Rate

Group	Mean	Std	t value	P Value
Before	170.25	35.84	-16.30	P<0.0001
After	296.25	64.3		

PEFR before treatment is 170.25 and after treatment is 296.25 which is statistically significant (p<0.0001).

Paired 't' test for Esionophila

Group	Mean	Std	t value	P Value
Before	6.00	2.428	12.262	P<0.0001
After	2.73	1.432		

Esionophila before treatment is 6.00 and after treatment is 2.73 which is statistically significant (p<0.0001).

Paired 't' test for ESR ½ Hr

Group	Mean	Std	t value	P Value
Before	5.42	2.747	-8.977	P<0.0001
After	3.16	1.838		

ESR 1/2 hrs before treatment is 5.42 and after treatment is 3.16 which is statistically significant (p<0.0001).

Paired 't' test for ESR 1 Hr

Group	Mean	Std	t value	P Value
Before	12.00	6.359	10.804	P<0.0001
After	7.21	4.351		

ESR 1 hrs before treatment is 12.00 and after treatment is 7.21 which is statistically significant (p<0.0001).

Paired 't' test for Grading of Asthma

Group	Mean	Std	t value	P Value
Before	2.65	0.864	15.959	P<0.0001
After	0.35	0.580		

Grading of Asthma before treatment is 2.65 and after treatment is 0.35 which is statistically significant (p<0.0001).

Paired 't' test clinical symptoms before and after treatment

Variable	Mean	Std. dev	t value	p value
Before	3.55	1.054	15.5	<0.0001
After	0.55	0.959		

Clinical symptoms before treatment is 3.55 and after treatment is 0.55 which is statistically significant (p<0.0001).

DISCUSSION

Swasa kasam is a disease characterised as sever cough with or without expectoration, Expiration is like a hiss of a serpent, frequent hemming, sense of heat in both nostrils, Hoarseness of voice, indigestion, flatulencen be correlated with Bronchial asthma in Modern science.

- The aim of the study is to the siddha to evaluate drug Thuthuvalayathy chooranam of the Siddha Herbo mineral formulation in the treatment of Swasakasam. The safety of the trial drug usage and standardization of the trial drug through biochemical analysis were also ensured during the study.
- The drug was prepared in the Gunapadam lab of National Institute of Siddha after the authentication of the raw drugs by the concerned department. The trial drug was prepared by the standard operating procedure as mentioned in the protocol.
- The preclinical toxicity studies (Acute and sub acute toxicity) for the above said trial drug was conducted at National Institute of Siddha after

getting the proper acceptance and permission from the Institutional Animal Ethical Committee (IAEC). The trial drug was proved to be safe for human beings from the observations made from the study.

- The biochemical qualitative and quantitative analysis were done at the biochemistry lab of NIS and IIT Chennai respectively. It revealed the presence of effective minerals and the existence of the drug molecules at micro level.
- The clinical study was conducted with a well defined protocol and a proper proforma after the approval of the Institutional Ethical Committee (IEC). After screening 60 cases reporting at the OPD of department of Maruthuvam, 40 cases were selected for induction to the trial. Before enrollment into the trial the informed consent was obtained from the patients.
- The patients were treated for a period of 24 days with Thuthuvalayathy (Internal medicine) at the dose of 1.5gms, twice a day with the adjuvant of honey.
- Clinical assessment was done during each visit in OPD patients (7 days once) and daily for IPD patients and the data were noted in the prescribed proforma.
- Laboratory investigations are done on the 0day, & 24^{th} day of the trial for both OP & IP patients. For IP patients, who was not in a situation to stay in the hospital for a long time was advised to attend the OPD for the continuation of the treatment. All the patients were put under observation for 2 months follow up period without the trial drug treatment.

The observations discussed below:

- **Sex Distribution**

  Out of 40 patients, the incidence of Swasa kasam was found to be higher in Females (26 cases, 65%).

- **Age Distribution**

A total of 40 patients of varying age group were included in this study, the maximum age distribution of Swasa kasam was in 31-40 age groups 13cases(32.5%) due to their life style.

- **Kaalam Distribution**

Out of 40 cases, 20 cases (50%) were found to be affected in their Vatha kaalam (Between 1 - 33 years) and 20 cases (50%) were found to be affected in their Pitha kaalam (Between 34 - 66 years).

- **Religion Distribution**

Among 40 cases, 37 cases (92.5%) were Hindu, 3 cases (7.5%) were Christians .

- **Thinai Distribution**

Among 40 cases, 14 cases (35%) belonged to the Kurinji (i.e Mountains and its surroundings) ,12 cases (30%) belonged to the neithal(i.e.sea & its surroundings),5 cases (12.5%) belonged to the Marutham (i.e. plain & its surroundings) and 9 cases (22.5%) belonged to the Mullai (i.e. Forst and its surrounding)

- **Paruva Kaalam Distribution**

Among 40 cases, 25 cases (62.5%) were reported in Kaar kaalam i.e. Avani & Purattasi (August 15 – October 15), 2cases (5%) were admitted reported in kothir kaalami.e.iypasi&karthigai(October16 - December15)and the remaining 13 cases (32.5%) were reported in Muthuvenil kaalam i.e. Aani & Aadi (June 16 & August 15). As per siddha literature Kaarkalam and Muthuvenil kaalam are the period of diseases. More over in Kaarkalam, Pitham is impaired and Kaba diseases occur due to contamination of water.

- **Occupational Distribution**

Most of the affected cases were housewives 14 cases, (35%), Students 4cases, (10%), Software Engineers5cases,(12.5%) , Mill workers,tailor,cook 2cases(5%)andTextileworkers,Salesrepresentative,Poulteryworker,Divers,Mechanic,Missionary,Gardener,Farmer,Leather factory worker,Dhobi,housemaid 1 cases,(2.5%) are affected due to smoke and dust exposure that will aggravates this disease .Moreover Sedentary life style adds more to this problem.

- **Distribution of cases as per Socio-Economic status**

Out of 40 cases the higher level of disease distribution was observed in middle socio economical groups 23 cases,(57.5 %) due to sedentary life style.

- **Distribution of cases as per Triggering factors :**

Among 40 cases, all the 40 cases were allergic to dust (100%), smoke exposure (100%),32 cases were allergic to cold exposure (80%) and food additive,occupation history found in 15 cases(37.5%) and emotional condition is responsible for 17 cases(42.5). As per the literature Dusty, Smoke exposure, Cold exposure and Excessive food items,lifestyle are considered to be the main predisposing factor of Swasa kasam. After treatment allergic to dust,cold,food are reduced to 50% cases in all cases.

- **Distribution of cases as per Clinical Features**

Before treatment among 40 cases, all the 40 cases(100%) had wheezing, dry or production cough ,tightness of chest , 36 cases (90%) had dysponea , 38 cases(95%) had Sleep disturbance, 32 cases(80%) had sneezing and 12cases (30%) had hoarseness of voice.After treatment all 40 cases (100%) were relieved from wheeze,tightness of chest,hoarseness of voice,breathlessness ,30 cases(75%) were relieved from cough , 38 cases(95%) were relieved from sleep disturbance, 34 cases(85%) were relieved from sneezing .

- **Distribution of cases by Duration of illness**

Out of 40 cases, most of the cases13 (32.5%) were affected in the duration of 3-6 year, 8(20%) of the cases were affected by the illness from 6month-1year,5(12.5%)cases were affected by the illness from3-6 month as well as 2-3year,6(15%) cases were affected by the illness from1-2 year.After treatment good prognosis seen in all cases.

- **Distribution of cases by Family History**

Among 40 cases 23 cases (57.5%) reported negative family history and 17 cases (42.5%) reported positive family history of Swasa kasam. It is showed that most of the patients had negative family history and positive family history is more seen in female 12(30%)case out of17 cases.

- **Distribution of cases by Diet**

Among 40 cases, 32 cases (80%) were Non-Vegetarian; remaining 8 cases (20%) were vegetarians. As per the literature, the dietary factors that cause the disease are taking non-vegetarian diet and taking improperly cooked food.

- **Distribution of cases by Habit**

  Among 40 cases the prevalence of the disease is more among smokers6cases (15%).

- **Derangements noted In Imporigal**

  Among 40 cases, Mookku was affected in 23 cases (57.5%) due to running nose and nasal block. Mei was affected in 8 cases (20%) due to pain in upper lower limbs and Kan was affected in 5 cases(12.5%) due to diminished vision. After treatment no nasal block and running nose in all cases.

- **Derangements noted In Kanmendhiriyam**

  Among 40 cases, Kai was affected in 4cases(10%) of the patients, Kaal was affected in6 cases(15%) of the patients due to pain in upper and lower limbs. Eruvai was affected in 7.5% of the patients due to constipation.

- **Derangements noted In Kosam**

  Out of 40 cases, Pranamaya kosam was affected in all the patients due to breathlessness, cough, wheeze and tightness of chest. Annamayakosam was affected in 16cases(40%) of the patients due to indigestion.After treatment pranamaya kosam and annamayakosam were normal in all cases.

- **Derangements noted In Vatham**

  Out of 40 cases observed , Pranan was affected in 40 cases(100%) due to breathlessness, cough, wheeze , Abanan was affected in 3 cases(7.5%) due to constipation, burning micturation, Udhanan was affected in 40 cases(100%) due to low pitched voice, Viyanan was affected in 10 patients (25%) due to pain in lower limbs, Koorman was affected in5 cases (12.5%) due to excessive lacrimation and diminished vision, Kirukaran was affected in 40 cases due to

excessive cough reflex, excessive sneezing reflex and Dhevathathan was affected in 38 cases (95%) due to tiredness.

- **Derangements noted In Pitham**

  Sadhaga pitham was affected in all 40 cases (100%), Anal pitham was affected in 16 cases (40%) due to indigestion ,poor appetite, Prasagapitham was affected in 8 cases (20%) due to lesions in any part of the body and pallor, Aalosaga pitham was affected in 5 cases (12.5%) due to dimnished vision and Ranjakapitham was affected in 8cases (20%) due to pallor .

- **Derangements noted In Kabam**

  Avalambagam was affected in all the 40 cases(100%) due to the presence of tightness of chest, cough, wheezing and breathlessness. Sandhigam was affected in 10 cases(25%) due to joints pain and Kilethagam was affected in 16 cases (40%) due to loss of appetite and Tharpagam was affected in 3 cases (7.5%) due to burning sensation of eyes.After treatment Avalambagam ,kiletham were normal in all cases.

- **Derangements Noted In Ezhu udal kattugal**

  Saram was affected in all cases (100%), Senneer was affected in 12 cases (30%) due to pallor ,Oon was affected in 8 cases (20%) due to joints pain,Kozhuppu was affected in 38cases(95%)due to body pain,Ennbu was affected in10 cases(25%)due to joint pain.

- **Derangements noted In Ennvagai thervugal**

  Mozhi was affected in all 40 cases (100%) due to low pitched voice and difficulty in speech, Naa was affected in 23cases (57.5%) due to coated tongue, pallor tongue, tongue ulcer, Vizhi was affected in 12 cases (30%) due to diminished vision, pallor, itching, Niram was affected in 8 cases (20%) due to skin lesions, Malam was affected in 3 cases (7.5%) due to constipation, Sparisam was affected in 4 cases (10%) of the patients due to sweating and

Moothiram was affected in 2 cases (5%) due to burning micturition. After treatment mozhi was normal in all cases,vizhi was normal in 4 cases.

- **Distribution of cases by Naadi**

In Naadi, vadha pitha naadi was observed in 24 cases (30%) ,pitha vatha naadi was observed in 12cases(30%)and kaba pitha naadi was observed in 4 cases(10%).

- **Distribution of cases by Neikuri**

Among 40 patients, Vadha neer was observed in 25 cases(62.5%), 17.5% of the Pitha neer was observed in 7 cases(17.5%) and kapha neer was observed in8 cases(20%).

Laboratory Investigations :

Routine investigations of blood and urine were done before and after treatment in every case.

Blood investigations of patients showed Eosinophils count was increased, its ranged from 5- 10% cells before treatment and after treatment its ranged from 3 – 6 %. ESR (Erythrocyte Sedimentation Rate) was raised in before treatment and the after treatment was moderately reduced.

Blood Urea, Creatinine, SGOT, SGPT and serum Alkaline Phosphatase were found to be in normal range before and after treatment.

Motion test (Ova, Cyst) revealed that 100% of the patients had nil results before treatment as well as after treatment.

Sputum examination (AFB) was found to be negative for all the 100% of both the patients.

- **Radiological Examination:**

Before treatment, chest X-ray PA view showed no abnormal findings observed in 100% of the 40 cases.

- **Special Investigation:**

Among the 26 Female (65%) patients the peak flow meter reading ranged from 100 lit/min to 180 lit/min before treatment and after treatment it ranged from 190lit/min to 360 lit/min.

Among the 14 Male (35%) patients the peak flow meter reading ranged from 160 lit/min to 250 lit/min before treatment and after treatment it ranged from 250lit/min to 430 lit/min.

- **Primary Outcome**

As per objective parameters (PEFR)

- Out of 40 cases, 29 (72.5%) cases has clinically good improvement, 9 (22.5%) cases has clinically moderate improvement and only one 1(5%) case has clinically mild improvement.

- **Secondary Outcome**

As per subjective parameters (Clinical symptoms)

Among 40 cases,all 40 cases(100%) of were relieved from breathlessness, tightness of chest and hoarseness,34cases(85%) were relieved from sneezing,30 cases(75%)were relieved from cough and38cases(95%) were relieved from Sleep disturbance.

- **Gradation Of Results**

Out of 40 cases, Clinical results were found to be Good in35(87.5%) of cases, moderate results were found in 4(10%)of cases and mild results were found in 1(2.5%) of cases.

- **Biochemical study:**
- Qualitative analysis of Thuthuvalayathy chooranam reveals that the trial medicine contains Sulphate, Phosphate, Magnesium, Alkaloid**,** Iron, Calcium, Ammonium**,** Silicate**,** Carbonate**,** Sodium**,** Chloride**,** Tannic acid**,** Reducing sugar**,** Copper**,** Lead and floride.
- **Acute oral toxicity study**

Thuthuvalayathi chooranam at the dose of 0.027gm/animal did not exhibit any mortality in mice. In Necropsy, the organs of the animal such as Liver, Heart,

Lungs, Pancreas, Spleen, Stomach, Intestine, Kidney, Urinary bladder, Uterus were appeared normal.

- **Sub acute toxicity study**

  Thuthuvalayathi chooranam at the dose of 0.27gm/animal(10x) did not exhibit any mortality in mice. Biochemical parameters and histopathology report were also normal. There were no signs of toxicity.

- PEFR**,** Esinophil,ESR for ½ hr and 1 hrs before treatment and after treatment is statistically significant ($p<0.0001$).

SUMMARY

- The aim of the study was to evaluate the therapeutic efficacy of the drug Thuthuvalayathy chooranam(internal medicine) in Swasa kasam.
- Before initiating the clinical trial, approval was got from the Institutional Animal Ethical Committee (1248/ac/09/CPCSEA/4/04/2011 – 20/12/2011) and Institutional Ethical Committee (NIS/IEC/2011/3/04 – 24/12/2011) for conducting the pre clinical studies and clinical studies respectively by submitting the well defined protocol and proforma.
- The raw drugs were authenticated by the concerned department and the trial drug was prepared by the investigator in the Gunapadam lab of National Institute of Siddha as per the Standard Operating Procedure mentioned in the protocol.

- The medicine was then subjected to pre clinical toxicity studies (Acute and sub acute toxicity studies) as per the protocol and the safety of the drug was ensured.
- From the Acute oral toxicity study, the trial drug was found to be safe even at higher dose level of 0.027gm/kg/bw.
- From the sub acute toxicity study the trial drug at the dose of 0.27gm/kg/bw (10X) did not exhibit any mortality in rats.
- The qualitative and quantitative bio chemical studies were done at the bio chemistry lab of National Institute of Siddha and IIT Chennai respectively.
- For the clinical study, 40 cases were selected based on the inclusion and exclusion criteria. Out of this, 30 cases were treated in OPD and 10 cases were treated in IPD of Ayothidoss pandithar hospital of NIS, Chennai.
- A day before starting the trial drug treatment, purgation was given to correct the elevated mukkutram.
- The clinical trial was conducted in 40 patients of Swasa kasam with the trial drug thuthuvalayathy chooranam(internal medicine) at the dose of 1.5gm twice a day with adjuvant of honey .During the study period, there were no adverse reactions.
- The trial drugs were found to play the major role to correct the deranged three humours, thereby correcting Pranan, Abanan, Udhanan, Kirugaran, Devathathan Vayus, Pitham such as Anal Pitham and the vitiated kabam is restored to the normal.
- Blood and urine Investigations were carried out before and after treatment and data were recorded in the proforma.
- Radiological investigations (Chest X-ray PA view) and ECG were also done before treatment.
- Clinical assessments Progress were done once in 7 days for OPD patients and daily for IPD patients.

- As per objective parameters (PEFR) Out of 40 cases, 72.5% of cases had clinically good improvement, 22.5% of cases had clinically moderate improvement and 5% of cases had clinically mild improvement.

- Out of 40 cases, Clinical results were found to be Good in 87.5% of cases, Moderate results were found in 10% of cases and Mild results were found in 2.5% of cases

- **Statistical analysis :**
    - PEFR **,** Esinophil,ESR for ½ hr and 1 hrs before treatment and after treatment is statistically significant ($p<0.0001$).

CONCLUSION

- Toxicity study reveals that the trial drugs is safe even in higher dosage of thuthuvalathy chooranam – 0.27 gm/animal in albino rats as per WHO guideline 1993.

- The results of the clinical trial indicate that the trial drugs are clinically effective. No adverse effects were reported during the course of treatment.

- The method of preparation is easy and the cost is comparatively economical.

- Clinical results were found to be Good in 87.5% of cases, moderate results were found in 10% of cases and mild results were found in 2.5% of cases.

Because of the encouraging results clinically, the study may be undertaken with same medicine in a large number of cases and it may throw new lights for the treatment of Swasa kasam.

TOXICOLOGICAL EVALUVATION OF THUTHUVALAYATHY CHOORANAM

ACUTE TOXICITY STUDY OF THUTHUVALAYATHY CHOORANAM

[WHO guidelines,1993]

Principle:

Acute toxicity was carried out in Swiss albino mice with a single exposure of 10 times of the recommended therapeutic dose of test compound the study duration will be 14 days.

Animal species **:** Swiss albino mice

Age / Weight / Size **:** 6 weeks. Mice-20-25 gms.

Gender **:** Both male and female

Number of Animals **:** Mice: 16

Acclimatization Period **:** 7 Days

Clinical dose **:** Thuthuvalayathy chooranam – 1.5mg/day

S.No	Group	No of mice
1	Vehicle control	6 (3 male, 3 female)
2	10XTherapeutic dose (0.027gm)	10 (5 male, 5 female)

Test Animals

Test animal laboratory of the King institute, Chennai and stocked at National institute of siddha, Chennai. All the animals were kept under standard environmental condition (27+ or – 2 degree c).The animals had free access to water and standard pellet diet(Sai meera foods pvt.ltd, Bangalore).The principles of laboratory animal care were followed and the Institutional ethical committee approved the use of animals and the study design. **(1248/ac/09/CPCSEA/december/2011)**

Route of administration:

Oral route was selected, because it is the normal route of clinical administration.

Test substance and vehicle

The Thuthuvalayathychooranam is light green in colour. The test substances are insoluble in water, in order to obtain and ensure the uniformity in drugs distribution, the drugs is dissolved by aqueous Tween 80 solution (10%).

Administration of doses

Thuthuvalayathychooranam was suspended in aqueous Tween 80 solution (10%), with uniform mixing and it was administered to the group's in a single oral dose. The control groups were received equal volume of the vehicle. The animals were weighed before giving the drug. The dose level was calculated according to body weight, and surface area. Since the clinical dose for Thuthuvalayathy chooranam was1.5gm/kg(0.27gm) They were converted to animal dose and then administered. The principle of laboratory animal care was followed.

Observations

Observations were made and recorded systematically and continuously observed as per the guideline after substance administration. Animals were observed individually (visual observations included skin changes, alertness, grooming, aggressiveness, sensitivity to sound, touch and pain, restlessness, tremors, convulsion, righting reflex, gripping reflex, pinna reflex, corneal reflex, writhing reflex, papillary reflex, urination, salivation, lacrimation for first 4 hrs, then periodically during the first 24 hrs. Animals were observed for body weight and mortality for 14 days. If animals dying during the period of study, the animals were sacrificed. At the end of the 14^{th} day all animals were sacrificed and necroscopy was done.

Body Weight

Individual weight of animals were determined before the test substance was administered and daily for 14 days. Weight changes were calculated and recorded. At the end of the test surving animals were weighed and sacrificed.

Results:

Thuthuvalayathychooranam at the dose 0.27gm/k animal .No behavior changes were noted for the first 4 hours and for the next 24 hours and throughout the study period of 14 days. No weight reduction was noted before and after the acute study duration. Reflexes were found to be normal before and after the study. All other observations were found to be normal before and after the study. In Necropsy, the

organs of the animal such as, Liver, Heart, Lungs, Pancreas, Spleen, Stomach, Intestine, Kidney, Urinary bladder, Uterus all appeared normal.

SUB ACUTE TOXICITY STUDY OF THUTHUVALAYATHY CHOORANAM

Animals **:** Male and Female Wister albino rats

Age **:** 6-8 weeks

Weight **:** 150-200 gms

Gender **:** Both male and female

Number of animals **:** Rat: 40

Acclimatization period **:** 7 Days

Clinical dose **:** 1.5gms\day

Clinical duration **:** 28 days

S.No	Group	No of Rats
1	Vehicle control (honey)	10 (5male,5 female)
2	1XTherapeutic dose (0.027gm)	10 (5male,5 female)
3	5XTherapeutic dose (0.135gm)	10 (5male,5 female)
4	10XTherapeutic dose(0.27gm)	10(5male, 5 female)

Animal source:

Test animals were obtained from the animal laboratory of the King institute, Chennai, and stocked at national institute of siddha, chennai. All the animals were kept under standard environmental condition (27+ or – 2 degree c) .The animals had free access to water and standard pellet diet (Sai durga foods pvt.ltd, Bangalore). The principles of laboratory animal care were followed and the Institutional ethical committee approved the use of animals and the study design. **(1248/ac/09/CPCSEA/December/2011)**

Identification of animal:

By cage number, animal number and individual marking on fur.

Housing and Environment:

The animals were housed in polypropylene cages provided with bedding of husk. Dark and light cycle each of 12 hours.

Administration period:

The period of administration of the test substance to animals are depending on the expected period of clinical use. Since the clinical duration of the test drug is 28 days and as per WHO guidelines the administration period is reported to be 1 month.

Dose selection:

The results of acute toxicity studies in Swiss albino mice indicated that thuthuvalayathy chooranam was non toxic and no behavioral changes, mortality was observed. On the basis of these results, the doses were selected for the study as per WHO guidelines.

Preparation and administration of dose:

Thuthuvalayathy chooranam was suspended in aqueous twin 80 solution (10%). It was administered to animals at dose levels of 1X therapeutic dose (0.027gm /animal), 5X Therapeutic dose (0.135gm/animal) and 10X Therapeutic dose (0.27gm/animal).The control animals were administered vehicle only. Administration was by oral (gavage) once a day for 30 days.

METHODOLODY:

Randomization, numbering and grouping of animal:

The animals were randomly divided into three groups for dosing up to 30 days. Each group consist of 10 animals (5 per sex in each group) were allowed acclimatization period of 7 days to laboratory conditions prior to the initiation of treatment. Each animal fur was marked with picric acid. The females were nulliparous and non pregnant.

OBSERVATION:

Experimental animals were kept under observation throughout the course of study for the following

Body weight:

Weight of each rat was recorded on day 1 and at weekly intervals throughout the course of study and at termination to calculate relative organ weights. From the data mean body weights and percent body gain were calculated.

Food and water consumption:

The quantity of food consumed by groups consisting of an animal for different doses was recorded at weekly intervals. Food consumed per animal was calculated for control and the treated dose groups

Clinical sings

All animals were observed daily for clinical sings. The time of onset intensity and duration of this symptom if any were recorded.

Mortality:

All animals were observed twice daily for mortality during entire course of study.

TERMINAL STUDIES:

LABORATORY INVESTIGATIONS:

Following laboratory investigations were carried out. On day 31 animals fasted overnight. Blood samples were collected by cardiac puncture using sodium heparin (200IU\ml) for blood chemistry and potassium EDTA (1.5 mg/ml) for hematology anticoagulant. Blood sample were centrifuged at 3000 r. p .m for 10 minutes.

BIOCHEMICAL INVESTIGATIONS:

The effect of **Thuthuvalayathy chooranam** on certain biochemical parameters were examined and compared with those of the control group. The blood samples collected with heparinized bottles were centrifuged at 5000 rpm for 10 minutes to obtain clear serum for the following investigation. Glucose was estimated using commercial Glucose estimation kit (Span Diagnostics) by the method of Barham *et al.*, (1972) and Tenscher. *et al.*, (1971),Haemoglobin PCV, RBC, Erythrocyte count was estimated by Hemocytometer method of Ghai (1995). Total Leukocyte Count was estimated by Hemocytometer method of John (1972).Total, (Bilirubin test kid-malloy and evelyn 1937) direct and indirect bilirubins were determined. Alkaline phosphatase, Alanine amino tranferase (ALT) and Aspartate amino transferase (AST) were measured by using ALT and AST test kit (kind & king) .Total protein TP concentration was determined. Albumin was determined based on its reaction with bromocresol green (binding method). Urea was determined according to urease – berthelot method and plasma creatinine was estimated using jaffe reaction. Results of biochemical investigations conducted on day 31 revealed significant changes in the values of different parameters studied when compared with those of respective controls.

Statistical analysis done for the above said biochemical investigations did not reveal any significant difference in values between the control groups and test groups stating that the provided test drug is non toxic.

NECROPSY:

All the animals were sacrificed on day 31 under ether anesthesia. Necropsy of all animals was carried out and the weights of the organs including liver, kidneys, brain, heart, lungs and sex organs were recorded.

HISTOPATHOLOGY:

Tissue samples of organs from control and treated animals were preserved in 10% formalin for preparation of sections using microtome. The organs included brain, heart, lungs, stomach, liver, kidneys, spleen, intestine, pancreas and sex organs of the animals were preserved and they were subjected to histopathological examination.

The organ pieces (3-5 micron) were fixed in 10% formalin for 24 hours and washed in running water for 24 hours .Samples were dehydrated in tissue processor and then cleaned in benzene to remove absolute alcohol. Embedding was done by passing the cleared sample through three cups containing molten paraffin at 50 degree c and then a cubical block of paraffin made by the L moulds it was followed by microtome and the slides were stained with haematoxylin–eosin stain. Stained sections of each organ were examined under light microscope at high (40X) power magnification. All the histo pathological slides were prepared at Vels University, pallavaram, Chennai.

Results:

Control animals

Liver: Shows central veins with rows of radiating heapatocytes, Portal triads and cells appear normal.

Kidney : Shows glomeruli tubules, interstitial cells of normal histology

Heart: Shows normal appearing myocardial fibres with patent coronaries.

Lung : Shows bronchioles, alveoli normal in appearance.

Stomach : Shows gastric mucosal glands lined by columnar cells.

Impression : Normal study

Test group animals

Liver : shows central veins with radiating cords of hepatocytes, portal trials and kupfer cells appear normal.

Kidney : shows normal appearing tubules and glomeruli.

Heart : shows normal appearing myocardial fibres wit patent coronaries.

Lungs: Shows bronchioles, alveoli normal in appearance.

Stomach : Shows gastric mucosa with glands lined by tall columnar cells and the muscular layer appear normal.

Impression : Normal study

Results:

- No weight loss, abnormal animal behaviours, metabolic functions [urination, lacrymation, defaecation etc.,] and mortality were noted.
- In necropsy of the animal organs showed normal appearance and weight.
- All Haematological and biochemical parameters were within normal limits.
- The stastical report of the Haematological and Biochemical datas didnot show any significant difference, between the control and test groups.
- In Histopathological studies, No abnormal findings were observed in the organs such as Heart, Liver, Lungs, Kidney and Stomach in X, 5X and 10X compared with control group.

BIO -CHEMICAL ANALYSIS OF THUTHUVALAYATHY CHOORANAM –

ANALYSED AT NATIONAL INSTITUTE OF SIDDHA

Preparation of Extract:

5gm Of Thuthuvalayathy Chooranam is weighed accurately and placed in a 250ml clean beaker and added with 50ml of distilled water. Then it is boiled well for about 10 minutes. Then it is cooled and filtered in a 100ml volumetric flask and made up to 100ml with distilled water.

S.No	EXPERIMENT	OBSERVATION	INFERENCE
1.	Appearance of sample	Brown in colour	
2.	**Solubility:** a. A little(500mg) of the sample is shaken well with distilled water. b. A little(500mg) of the sample is shaken well with con. HCl/Con. H_2So_4	Sparingly soluble	Presence of Silicate
3.	**Action of Heat:** A small amount(500mg) of the sample is taken in a dry test tube and heated gently at first and then strong.	No Yellow fumes developed.	Absence of Carbonate
4.	**Flame Test:** A small amount(500mg) of the sample is made into a paste with con. HCl in a watch glass and introduced into non-luminous part of the Bunsen flame.	Bluish green flame appeared.	presence of Copper
5.	**Ash Test:s** A filter paper is soaked into a mixture of sample and dil. cobalt nitrate solution and introduced into the Bunsen flame and ignited	Yellow colour flame	Presence of sodium

S.No	EXPERIMENT	OBSERVATION	INFERENCE
	I.Test For Acid Radicals		
1.	**Test For Sulphate :** 2ml of the above prepared extract is taken in a test tube to this added 2ml of 4% dil ammonium oxalate solution.	Cloudy appearance present	Presence of Sulphate

2.	**Test For Chloride:** 2ml of the above prepared extracts is added with 2ml of dil-HCl is added until the effervescence ceases off.	Cloudy appearance present	presence of Chloride
3.	**Test For Phosphate:** 2ml of the extract is treated with 2ml of ammonium molybdate solution and 2ml of con.HNO_3	yellow colour appearance	Phosphate present
4.	**Test For Carbonate:** 2ml of the extract is treated with 2mldil. magnesium sulphate solution	No cloudy appearance	Absence of Carbonate
5.	**Test For Fluoride & Oxalate:** ıct is added with 2ml of dil. Acetic acid and 2ml dil.calcium chloride solution and heated.	Cloudy appearance present.	Presence of fluoride and oxalate
6.	**Test For Nitrate:** 1gm of the substance is heated with copper turning and concentrated H2So4 and viewed the test tube vertically down	No Brown gas is evolved	Absence of Nitrate
7.	**Test For Sulphide:** 1gm of the substance is treated with 2ml of con. HCL	No Rotten Egg Smellinggas evolved	Absence of Sulphide
8.	**Test For Nitrite:** 3drops of the extract is placed on a filter paper, on that-2 drops of dil.acetic acid and 2 drops of dil. Benzidine solution is placed.	No Characteristic changes	Absence of Nitrite

9.	**Test For Borate:** 2 Pinches(50mg) of the substance is made into paste by using dil.sulphuric acid and alcohol (95%) and introduced into the blue flame.	Bluish green colour flame not appeared	Absence of Borate
	II. Test For Basic Radicals		
1.	**Test For Lead:** 2ml of the extract is added with 2ml of dil.potassium iodine solution.	Yellow Precipitate is obtained.	presence of Lead
2.	**Test For Copper:** One pinch(50mg) of substance is made into paste with con. HClin a watch glass and introduced into the non-luminuous part of the flame.	No colour precipitate formed.	Presence of Copper
3.	**Test For Aluminium:** To the 2ml of extract dil.sodium hydroxide is added in 5 drops to excess.	No Yellow colour appeared	Absence of Aluminium
4.	**Test For Iron:** a. To the 2ml of extract add 2ml of thiocyanate ammonium solution b. To the 2ml of extract 2ml thiocyanate ammonium solution and 2ml of con HNO_3 is added	Mild red colour appear	Presence of Iron
5.	**Test For Zinc:** To 2ml of the extract dil.sodium hydroxide solution is added in 5 drops to excess and dil.ammonium chloride is added.	White precipitate is not formed	presence of Zinc
6.	**Test For Calcium:** 2ml of the extract is added with 2ml	Cloudy appearance and white precipitate is obtained	Presence of Calcium

	of 4% dil.ammonium oxalate solution		
7.	**Test For Magnesium:** To 2ml of extract dil.sodium hydroxide solution is added in drops to excess.	White precipitate is obtained	Presence of Magnesium
8.	**Test For Ammonium:** To 2ml of extract 1 ml of Nessler's reagent and excess of dil.sodium hydroxide solution are added.	Brown colour appeared	Presence of Ammonium
9.	**Test For Potassium:** A pinch(25mg) of substance is treated of with 2ml of dil.sodium nitrite solution and then treated with 2ml of dil.cobalt nitrate in 30% dil.glacial acetic acid.	No Yellowish precipitate is obtained.	Presence of Potassium
10.	**Test For Sodium**: 2pinches(50mg) of the substance is made into paste by using HCl and introduced into the blue flame of Bunsen burner.	Yellow colour flame appeared	Presence of Sodium
11.	**Test For Mercury**: 2ml of the extract is treated with 2ml of dil.sodium hydroxide solution.	No yellow precipitate is obtained	Absence of Mercury
12.	**Test For Arsenic:** 2ml of the extract is treated with 2ml of dil.sodium hydroxide solution.	No brownish red precipitate is obtained	absence of Arsenic
	III. Miscellaneous		
1.	**Test For Starch:** 2ml of extract is treated with weak dil.iodine solution	No blue colour developed	Absence of Starch
2.	**Test For Reducing Sugar:** 5ml of Benedict's qualitative solution is	Brick red colour	Presence of Reducing sugar

	taken in a test tube and allowed to boil for 2 minutes and added 8 to 10 drops of the extract and again boil it for 2 minutes. The colour changes are noted.	developed	
3.	**Test For The Alkaloids:** a) 2ml of the extract is treated with 2ml of dil.potassium lodide solution. b) 2ml of the extract is treated with 2ml of dil.picric acid. c) 2ml of the extract is treated with 2ml of dil.phosphotungstic acid.	Yellow colour developed	Presence of Alkaloid
4.	**Test For Tannic Acid:** 2ml of extract is treated with 2ml of dil.ferric chloride solution	Block precipitate is obtained	Presence of Tannic acid
5.	**Test For Unsaturated Compound:** To the 2ml of extract 2ml of dil.Potassium permanganate solution is added.	Potassium permanganate is decolourised	Presence of unsaturated compound
6.	**Test For Amino Acid:** 2 drops of the extract is placed on a filter paper and dried well. 20ml of Biurette reagent is added.	Violet colour developed	Absence of Amino acids
7.	**Test For Type Of Compound:** 2ml of the extract is treated with 2 ml of dil.ferric chloride solution.	No Brown colour developed	Absence of Oay quinole, Pinephrine and Pyro catechol

Preliminary Qualitative phyto chemical tests procedure and interpretation of results for Thuthuvalayathychooranam

S.NO	PROCEDURE	INFERENCE
1.	**Sulphate**	Presence of Sulphate
2.	**Calcium**	Presence of Calcium
3.	**Chloride**	Presence of Chloride
4.	**Carbonate**	Absence of Carbonate
5.	**Starch**	Absence of Starch
6.	**Iron**	Presence of Iron
7.	**Phosphate**	Presence of Phosphate
8.	**Tannic acid**	Presence of Tannic acid
9.	**Aluminium**	Absence of Aluminium
10.	**Magnesium**	Presence of Magnesium
11.	**Ammonium**	Presence of Ammonium
12.	**Mercury**	Absence of Mercury
13.	**Alkaloids**	Presence of Alkaloids
14.	**Reducing Sugar**	Presence of reducing sugar
15.	**Silicate**	Presence of Silicate
16.	**Copper**	presence of Copper
17.	**Sodium**	Presence of Sodium
18.	**Lead**	Presence of Lead
19.	**Fluoride And Oxalate**	Presence of Fluoride and Oxalate
20.	**Oay quinole, pinephrine and pyrocatechol**	Absence of Oay quinole, pinephrine and pyrocatechol

QUANTITATIVE ANALYSIS

Thuthuvalayathy Chooranam ----------

	Ca 317.93	362.142 mg/L
	Al 308	BDL
	B 249.773	475.236 mg/L
	As193.696	BDL
	Cd 226.502	BDL

Cu 324.754	11.846 mg/L
Fe 238.204	21.428 mg/L
Hg253.652	BDL
K 766.491	239.177 mg/L
Mg 257.610	5.645 mg/L
Na 588.995	487.327 mg/L
P 214.914	55.442 mg/L
Pb 230.204	BDL
S 181.975	74.951 mg/L
Si 251.611	6.170 mg/L

PHYSICOCHEMICAL PROPERTIES

Table-1.

Colour characters of Thuthuvalayathy Chooranam.

S No	Solvent used	Under ordinary light	Under ultra violet light
1	PPM	**Light Green**	**Light Green**

PPM-Powdered plant material

Table-2.

Physicochemical properties of Thuthuvalayathy Chooranam..

		Values obtained	Heavy/ toxic metals

S No.	Parameters	(%w/w)		
1	Total ash value	7.42	Lead	BDL
2	Acid insoluble ash	0.66	Cadmium	BDL
3	Water soluble ash	7.95	Mercury	BDL
4	Moisture content	10.43	Arsenic	BDL
5	Foreign organic matter	8.2		
6	Crude fibre content	26		
7	Alcohol soluble extractive	7.12		
8	Water soluble extractive	10.53		

Table-3.

Colour, nature and percent yields of extracts of Thuthuvalayathy Chooranam.

S.no.	Extract Solvents	Colour	TLC/GC (PEAKS)	Nature	% Yield(w/w)	SEM-Micro graph partical size range in micron	pH
1	Water	Light Green	**7**	**Solid**	48	1 - 10 micron	7.4 – 7.6

Table-4.

Preliminary phytochemical analysis of different extracts of Thuthuvalayathy Chooranam.

S.no	Phytoconstituents	Aqueous

1	Alkaloids	+
2	Flavonoids	+
3	Saponins	+
4	Glycosides	+
5	Carbohydrates	+
6	Amino acids	+
7	Triterpenoids	+

+ = Present, − = Absent

HR SEM-METHODOLOGY:

An SEM is essentially a high magnification microscope, which uses a focussed scanned electron beam to produce images of the sample, both top-down and, with the necessary sample preparation, cross-sections. The primary electron beam interacts with the sample in a number of key ways:-

- Primary electrons generate low energy secondary electrons, which tend to emphasize the topographic nature of the specimen.
- Primary electrons can be backscattered which produces images with a high degree of atomic number (Z) contrast.
- Ionized atoms can relax by electron shell-to-shell transitions, which lead to either X-ray emission or Auger electron ejection. The X-rays emitted are characteristic of the elements in the top few μm of the sample.

SAMPLE PREPARATION:

Sample preparation can be minimal or elaborate for SEM analysis, depending on the nature of the samples and the data required. Minimal preparation includes

acquisition of a sample that will fit into the SEM chamber and some accommodation to prevent charge build-up on electrically insulating samples. Most electrically insulating samples are coated with a thin layer of conducting material, commonly carbon, gold, or some other metal or alloy. The choice of material for conductive coatings depends on the data to be acquired: carbon is most desirable if elemental analysis is a priority, while metal coatings are most effective for high resolution electron imaging applications. Alternatively, an electrically insulating sample can be examined without a conductive coating in an instrument capable of "low vacuum" operation.

The SEM is carried out by using FEI-Quanta FEG 200-High Resolution Instrument.

Resolution : 1.2 nm gold particle separation on a carbon substrate

Magnification: From a min of 12x to greater than 1, 00,000 X

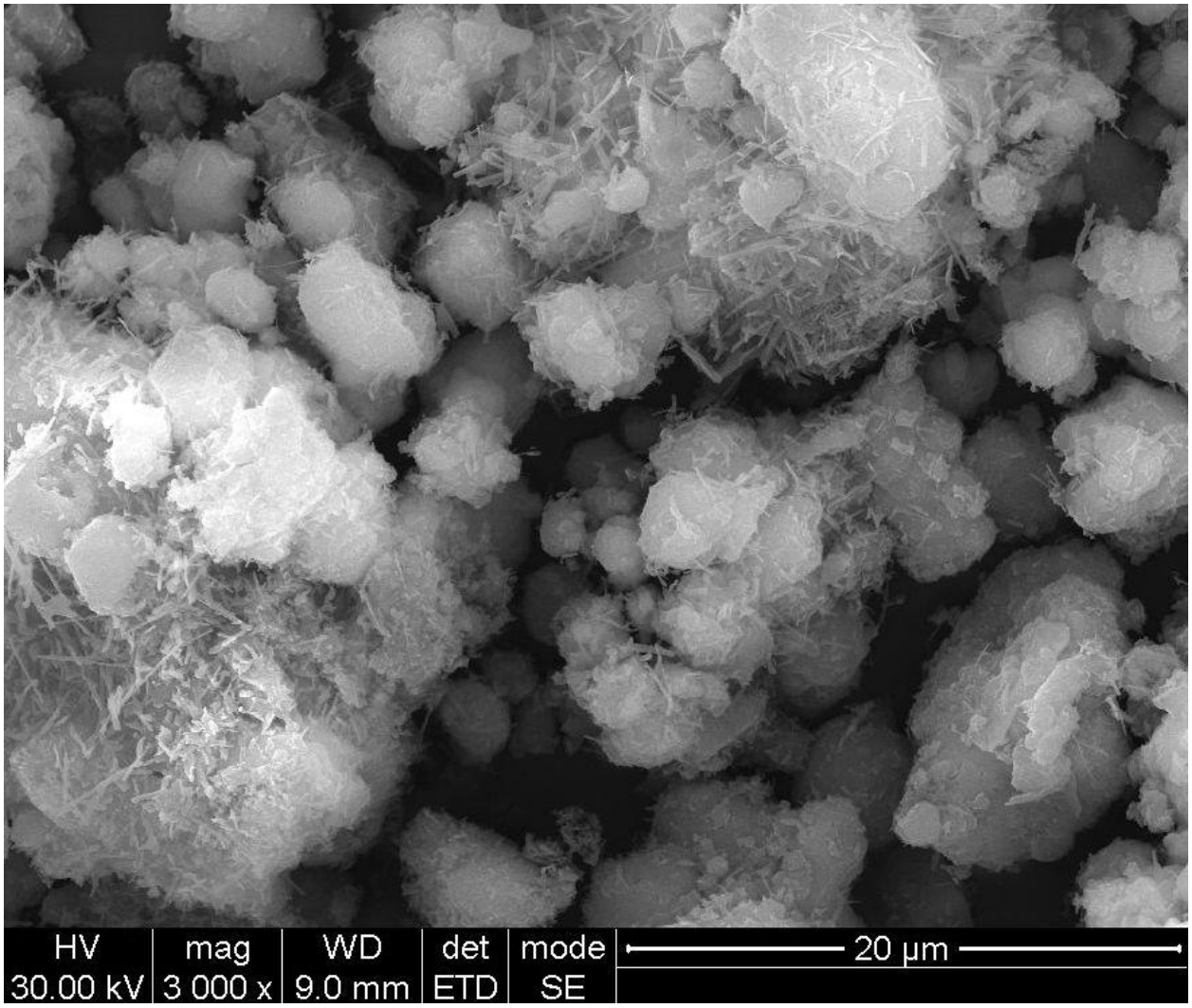
Application : To evaluate grain size, particle size distributions, material homogeneity and inter metallic distributions

.

Experimental Procedure: Done at SAIF, IIT Madras, Chennai-36

SEM – Micro graph partical size

THURHUVALAYATHY CHOORANAM



NATIONL INSTITUTE OF SIDDHA,

AYOTHIDASS PANDITHAR HOSPITAL,
CHENNAI-47
FORM I- SCREENING PROFORMA

PRECLINICAL AND CLINICAL STUDY ON *SWASA KASAM* (BRONCHIAL ASTHMA) AND DRUG OF CHOICE IS *"THUTHUVALAYATHY CHOORANAM " (INTERNAL)* .

REG NO: 32101201 / 2012-13

1. O.P No ---------- 2. S. No-----

3 .Name ---------- 4. Age --------- 5 . Gender : Female / Male

6 .Occupation ----------

7 .Address ----------

8.INCLUSION CRITERIA Yes No

- Age : 18- 60 Yrs ☐ ☐
- Sex – Both Male and Female ☐ ☐
- The symptoms of, cough, wheezing, Difficulty in breathing etc ☐ ☐
- PEFR below normal range (from 150 L/min to 250 L/min for men; from 100 L/min to 200 L/min for women). ☐ ☐
- H/O allergy ☐ ☐
- Patient willing to sign the informed consent stating that he/she will conscientiously stick to the treatment during 24 days but can opt out of the trial of his/her own conscious discretion. ☐ ☐
- Patients who are willing to subject themselves to take X Ray of Chest (PA view) ECG, PEFR, as well as to Undergo routine lab investigation. ☐ ☐

9. EXCLUSION CRITERIA Yes No

1. Cardiac disease. ☐ ☐
2. Renal disease. ☐ ☐
3. Tuberculosis. ☐ ☐
4. COPD. ☐ ☐
5. Status asthmaticus. ☐ ☐

 ☐ ☐

6. Diabetes mellitus.

7. Hyper tension. ☐ ☐

8. Pregnancy. ☐ ☐

9. Lactation. ☐ ☐

10.psychological factor. ☐ ☐

11.worm infestation. ☐ ☐

10. PEFR(Peak Expiratory Flow Rate) [L/min] –

11.ADMITTED TO TRAIL : YES ☐ **NO** ☐

If Yes Serial NO: ----------

Date:
Station:

Signature of the Investigator:

Signature of the Lecturer:

Signature of the

NATIONAL INSTITUTE OF SIDDHA,
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CHENNAI-47

FORM l A -HISTORY PROFORMA ON ENROLLMENT

PRECLINICAL AND CLINICAL STUDY ON *SWASA KASAM* (BRONCHIAL ASTHMA) AND DRUG OF CHOICE IS *"THUTHUVALAYATHY CHOORANAM " (INTERNAL)* .

REG NO: 32101201 / 2012-13

1. O.P/ I.P No ---------- 2. S. No-----

3 .Name ---------- 4. Age --------- 5 . Gender : Female / Male

6 .Occupation ----------

7 .Address ----------

8.Educational Status: A) Illiterate ☐ B)Literate ☐

9.Height: cms **10.Weight:** kg

11. Complaints and Duration:

……..
……..
……..

12. Habit of

	Yes	No	
A) Smoking	☐	☐	……
B) Alcoholism	☐	☐	……
C) Tobacco chewing	☐	☐	……..
D) Betel nut chewing	☐	☐	……

13.Dietary style:

vegetarian ☐ **Non vegetarian** ☐

14.DrugHistory:

15. Wheezing trigger factors:

Dust	Yes/No	Food additive	Yes/No
Smoke exposure	Yes/No	Fumes of paints and petrol.	Yes/No
Cold exposure	Yes/No	Detergents	Yes/No
Exercise	Yes/No	Chemicals	Yes/No
Emotion	Yes/No	Husks, grass, pollans.	Yes/No
Occupation	Yes/No	Menstruation	Yes/No
Others			

15 MARITAL STATUS 1.Married ☐ 2.Unmarried ☐

No of children: ☐

16. FAMILY HISTORY

☐ ☐

Whether this problem runs in family? 1. Yes 2.No

If yes, mention the relationship of affected person(s) ----------
---

17. MENSTRUAL HISTORY:

Regular ☐ **Irregular** ☐ **Menopause** ☐

18. BOWEL HABITS & MICTURITION: Normal 1. Yes ☐ ☐
2.No

History of habitual constipation	1.Yes	☐	2.No	☐
History of frequent diarrhoea	1.Yes	☐	2.No	☐
History of frequent dysuria	1.Yes	☐	2.No	☐

Date:

Station:

Signature of the Investigator: **Signature of the Lecturer:**

Signature of the HOD

NATIONAL INSTITUTE OF SIDDHA
CHENNAI -47
DEPARTMENT OF MARUTHUVAM

PRECLINICAL AND CLINICAL STUDY ON *SWASA KASAM* (BRONCHIAL ASTHMA) AND DRUG OF CHOICE IS *"THUTHUVALAYATHY CHOORANAM " (INTERNAL)* .

REG NO: 32101201 / 2012-13

FORM II CLINICAL ASSESSMENT ON ENROLLMENT AND ON VISITS

1. O.P/ I.P No ---------- 2. S. No-----

3 .Name ---------- 4. Age --------- 5 . Gender : Female / Male

6 .Occupation ----------

7 .Address ----------

---

8. Date of assessments:

SIDDHA SYSTEM OF EXAMINATION

1 ENVAGAI THERVU: [EIGHT-FOLD EXAMINATION]

I. NAADI: [PULSE PERCEPTION]

	0th Day	8th Day	15thDay	22nd Day	25th Day		0th Day	8thDay	15th Day	22nd Day	25th Day
Vali						Iyya vali					
Azhal						Vali Iyyam					
Iyyam						Azhal Iyyam					
Vali Azhal						Iyya Azhal					
Azhal vali											

II. NAA [TONGUE]

	0th Day	8 thDay	15th Day	22nd Day	25th Day
Colour	Normal/pigmented /cyanosed/Yellow/ Red/Pale	Normal/pigmented / cyanosed/Yellow/ Red/Pale	Normal/pigmented/ cyanosed/Yellow/ Red/Pale	Normal/pigmented /cyanosed/Yellow/ Red/Pale	Normal/pigmented/ cyanosed/Yellow/ Red/Pale
Taste	Sweet / Bitter/ Sour/Pungent/ None	Sweet/ Bitter/ Sour/ Pungent/ None	Sweet/ Bitter/ Sour/ Pungent/ None	Sweet/Bitter/Sour/ Pungent/None	Sweet/Bitter/Sour/ Pungent/None
Coating	Present/Absent	Present/Absent	Present/Absent	Present/Absent	Present/Absent
Fissure	Present/Absent	Present/Absent	Present/Absent	Present/Absent	Present/Absent
Saliva	Normal/Increased/ Decreased	Normal/Increased/ Decreased	Normal/Increased/D ecreased	Normal/Increased/ Decreased	Normal/Increased/ Decreased
Dryness	Present/Absent	Present/Absent	Present/Absent	Present/Absent	Present/Absent
Glossitis	Present/Absent	Present/Absent	Present/Absent	Present/Absent	Present/Absent
Baldness	Presesnt/Absent	Present/Absent	Present/Absent	Present/Absent	Present/Absent

III.NIRAM: [COMPLEXION]

0th Day	8th Day	15th Day	22nd Day	25th Day
Wheatish/fair/Dark/ Yellow tinted/Pale	Wheatish/fair/Dark/ Yellowtinted/Pale	Wheatish/fair/Dark/ Yellowtinted/Pale	Wheatish/fair/Dark/ Yellowtinted/ Pale	Wheatish/fair/Dark/ Yellow tinted/ Pale

IV.MOZHI: [VOICE]

0th Day	8th Day	15th Day	22nd Day	25th Day
Medium/High/Low/ Pitched	**Medium/ High/ Low/ Pitched**	**Medium/ High/ Low/ Pitched**	**Medium/ High/ Low/ Pitched**	**Medium/ High/ Low/ Pitched**

V.VIZHI: [EYES] (Lower palpabrel conjunctiva)

0th Day	8th Day	15th Day	22nd Day	25th Day
Normal/Yellow/ Red/ Pale	**Normal/Yellow Red / Pale**	**Normal/Yellow Red / Pale**	**Normal/Yellow Red / Pale**	**Normal/Yellow Red / Pale**

VI. MALAM; [BOWEL HABITS / STOOLS]

	0th Day	8th Day	15 th Day	22nd Day	25th Day
Colour	Dark/Yellow/ Red/Pale	Dark/Yellow/ Red/Pale	Dark/ Yellow/Red/Pale	Dark/ Yellow/Red/Pale	Dark/ Yellow/Red/Pale
Consistency	Solid/Semisolid/ Watery	Solid/Semisolid/ Watery	Solid/Semisolid/ Watery	Solid/Semisolid/ Watery	Solid/Semisolid/ Watery
Stool bulk	Normal/Reduced	Normal/Reduced	Normal/Reduced	Normal/Reduced	Normal/Reduced
Constipation	Present/Absent	Present/Absent	Present/Absent	Present/Absent	Present/Absent
Diaarhoea	Present/Absent	Present/Absent	Present/Absent	Present/Absent	Present/Absent
Mucous	Present/Absent	Present/Absent	Present/Absent	Present/Absent	Present/Absent
Blood	Present/Absent	Present/Absent	Present/Absent	Present/Absent	Present/Absent

VII. URINE EXAMINATION(muthiram)

Neerkuri	0th Day	8th Day	15th Day	22nd Day	25th Day
Niram [Colour]	White/Yellowish / Straw coloured/ Crystal clear	White/Yellowish/ Straw coloured/ Crystal clear	White/Yellowish/ Strawcoloured/ Crystal clear	White/Yellowish/ Straw coloured/ Crystal clear	White/Yellowish/ Straw coloured/ Crystal clear
Manam	Present/ Absent	Present/ Absent	Present/ Absent	Present/ Absent	Present/ Absent

[Odour]					
Nurai [Froth]	Nil/Reduced/ Increased	Nil/Reduced/ Increased	Nil/Reduced/ Increased	Nil/Reduced/ Increased	Nil/Reduced/ Increased
Edai [Sp.gravity]	Normal/Increased/Reduced	Normal/Increased/ Reduced	Normal/Increased/ Reduced	Normal/Increased/ Reduced	Normal/Increased/ Reduced
Enjal [Deposits]	Present/ Absent	Present/ Absent	Present/ Absent	Present/ Absent	Present/ Absent
Volume	Normal/Increased/Reduced	Normal/Increased/ Reduced	Normal/Increased/ Reduced	Normal/Increased/ Reduced	Normal/Increased/ Reduced

VIII . NEIKURI

	0^{th} day	8^{th} day	15^{th} day	22^{nd} day	25^{th} day
Serpentine fashion	at____ minutes	at____ minutes	at____ minutes	at____ minutes	at____ minutes
Annular/Ringed fashion	at____ minutes	at____ minutes	at____ minutes	at____ minutes	at____ minutes
Pearlbeaded fashion	at____ minutes	at____ minutes	at____ minutes	at____ minutes	at____ minutes
Mixed fashion	at____ minutes	at____ minutes	at____ minutes	at____ minutes	at____ minutes
Other fashion	at____ minutes	at____ minutes	at____ minutes	at____ minutes	at____ minutes

1 . SPARISAM: [PALPATORY PERCEPTION]

0^{th} Day	8^{th} Day	15^{th} Day	22^{nd} Day	25th Day
Warmth/cold/ Sweat	Warmth/cold/ Sweat	Warmth/cold/ Sweat	Warmth/cold/ Sweat	Warmth/ cold/Sweat

2.THEGI: [TYPE OF BODY CONSTITUTION]

Vatham predominant	Pitham predominant	Kabam predominant	Thondha udal

3.NILAM: [LAND WHERE PATIENT LIVED MOST]

Kurinji ☐ Mullai ☐ Marutham ☐ thal ☐ alai ☐

(Hilly terrain) (Forest range) (Plains) (Coastal belt) (Arid regions)

4. KAALAM

Kaarkalam- ☐ Koothirkalam ☐ Munpanikalam ☐

Panikalam ☐ Ilavenil- ☐ Muthuvenil ☐

5. GUNAM

Sathuvam ☐ Rasatham ☐ Thamasam ☐

6. IMPORIGAL (SENSORY ORGANS)

	0th day		8th day		15th day		22nd day		25th day	
	Normal	Affected	Normal	Affected	Normal	Affected	Normal	Affected	Normal	Affected
Mei (Skin)										
Vai (Buccal Cavity)										
Kann (Eye)										
Mooku (Nose)										
Sevi (Ear)										

7. KANMENDRIYAM (MOTOR ORGANS)

	0th day		**8th day**		**15th day**		**22nd day**		**25th day**	
	Normal	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**
Kai (upper limb)										
Kaal (lower limbs)										
Vai (buccal cavity)										
Eruvai (excretory organs)										
Karuvai (reproductive organs)										

8. KOSANGAL(Sheath)

	0th day		**8th day**		**15th day**		**22nd day**		**25th day**	
	Normal	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**
Annamaya kosam										
Pranamaya kosam										

Manomaya kosam										
Vignanamaya kosm										
Ananthamaya kosm										

9. SEVEN DHATHUS: (7 SOMATIC COMPONENTS)

	0th day		**8th day**		**15th day**		**22 nd day**		**25th day**	
	Normal	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**
Saaram [chyme]										
Senneer [Blood]										
Oon [Muscle]										
Kozhuppu [Fat]										
Enbu [Bones]										
Moolai [Bonemarrow]										
Sukkilam/ Suronitham [Genital discharges]										

10.MUKKUTRAM:[AFFECTION OF THREE HUMORS]

A)VATHAM:

	0th day		**8th day**		**15th day**		**22nd day**		**25th day**	
	Normal	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**
Praanan										
Abaanan										
Samaanan										
Udhaanan										

Viyaanan										
Naagan										
Koorman										
Kirukaran										
Devathathan										
Dhananjeyan										

B) PITHAM:

	0th day		**8th day**		**15th day**		**22nd day**		**25th day**	
	Normal	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**
Analapitham										
Prasakam										
Ranjakam										
Aalosakam										
Saathakam										

C) KABAM:

	0 th day		**8th day**		**15th day**		**22nd day**		**25th day**	
	Normal	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**	**Normal**	**Affected**
Avalambagam										
Kilethagam										
Pothagam										
Tharpagam										
Santhigam										

11.GENERAL EXAMINATION

	0^{th} day	8^{th} day	15^{th} day	22^{nd} day	25^{th} day
Height (cms)					
Weight (kg)					
Temperature(°F)					
Pulse rate (permin)					
Heart rate (per min)					
Respiratory rate(per min)					
Blood pressure(mm/Hg)					
Pallor					
Jaundice					
Cyanosis					
Lymphadenopathy					
Pedal edema					
Clubbing					
Jugular vein pulsation					

12.SYSTEMIC EXAMINATION :Respiratory system

I.Inspection:

	0^{th} day	8^{th} day	15^{th} day	22^{nd} day	25^{th} day
Trachea					
Drooping of shoulder					
Form of chest					
Apical impulse					
Intercostal Muscle Wasting					
Intercostal bulging					

Respiratory movement					
Measurements: AP - Transverse -					

II . Palpation :

	0^{th} day	8^{th} day	15^{th} day	22^{nd} day	25^{th} day
Tracheal position (trial's sign)					
Apical impulse					
Respiratory Movements					
Tactile vocal fremitus					

III. Percussion ;

	0^{th} day	8^{th} day	15^{th} day	22^{nd} day	25^{th} day
Normal /Dullness/ hyper-resonance					

IV. Auscultation :

	0^{th} day	8^{th} day	15^{th} day	22^{nd} day	25^{th} day
Character of Breath Sound					
Foreign Sounds					
Vocal Resonance					

V. Sputum:

	0^{th} day	8^{th} day	15^{th} day	22^{nd} day	25^{th}
Colour	White/Green/ Yellow/red	White/Green/ Yellow/red	White/Green/Yellow/ Red	White/Green/Yellow/ red	White/Green/Yellow/ red
Amount	Less/More	Less/more	Less/More	Less/More	Less/More
Consistency	Mucoid/Purulent /Frothy	Mucoid/Purulent /Forthy	Mucoid/Purulent/ Forthy	Mucoid/Purulent/ Forthy	Mucoid/Purulent /Forthy

Odour	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Other Systemic Examination:

	0^{th} day	8^{th} day	15^{th} day	22^{nd} day	25^{th} day
Cardio vascular system					
Alimentary system					
Central Nervous system					
Locomotor system					
Genito-Urinary system					
Endocrine system					

12.Clinical Symptoms:

	0^{th} day	8^{th} day	15^{th} day	22^{nd} day	25^{th} day
Difficulty in breathing					
Tightness of chest					
Wheeze - Added sound (rhonchi)					
Dry(or)productive cough					
Sneezing					
Hoarseness of voice					
Sleep disturbance					
Associated symptoms					

Date :

Station:

Signature of the Investigator:

Signature of the Lecturer: **Signature of the HOD**

NATIONAL INSTITUTE OF SIDDHA
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PRECLINICAL AND CLINICAL STUDY ON *SWASA KASAM* (BRONCHIAL ASTHMA) AND DRUG OF CHOICE IS *"THUTHUVALAYATHY CHOORANAM " (INTERNAL) .*

FORM III - LABORATORY PARAMETERS-CHART

1. Serial No: _____ 2.Lab No :
3. Name: _____ 4.Age: _____ years
5.Gender: Male/Female

BLOOD INVESTIGATION		BEFORE TMT Date:	AFTER TMT Date	NORMAL VALUES
HB(gms%)				Men- 12.0-17.0 Women – 11.0-16
T.RBC(milli/cu.mm)				Men-4.4-5.7 Women-3.8-5.0
ESR (mm)	½ hr.			Men-1-13 Women-1-20
	1 hr.			
T.WBC (cu.mm)				M:4000-11000 W:4000-11000
DIFFERENTIAL COUNT (%)	Polymorphs			40-75%
	Lymphocutes			20-40%
	Monocytes			2-10%
	Esonophils			1-6%
	Basophils			0-1%
Bloodglucose (mg/dl)	Fasting			70-110
	PP			80-140
	Random			80-120

BLOOD INVESTIGATION		BEFORE TMT Date:	AFTER TMT Date	NORMAL VALUES
Lipid profile (mg/dl)	Serum cholesterol			150-120
	HDL			30-60
	LDL			Upto 130
	VLDL			40
	TGL			Upto 160
RFT (mg/dl)	Blood urea			16-50
	Serum creatinine			0.6-1.2
	Serum Uric acid			Men:3-9, W0men:2.5-7.5
LFT (mg/dl)	Total bilirubin			0.3-1
	Direct bilirubin			0.1-0.3
	Indirect bilirubin			0.2-0.8
	Serum totalprotein			6-8
	Serum Albumin			3.5-5.5
	Serum globulin			2-3.5
	Fibrinogen(g/dl)			0.2-0.4
	Serum calcium			9-11
	Serum phosphorous			2-5
	SGOT (IU/L)			6-18
	SGPT (IU/L)			3-26
	Alkaline phosphatase (IU/L)			290(IU/L)
Peak Expiratory Flow Rate (lit / min)				M : adult 400-650: above 40yr 300-500 F :adult 250-450: above 40yr 200-400

Urine investigation	Before TMT Date:	After TMT Date:
Neer Kuri		
Niram		
Manam		
Nurai		
Edai		
Enjai		
Neikuri		
Albumin		
Fasting sugar		
PP sugar		
Random Sugar		
Deposits		
Bile salt		
Bile pigments		
Urobilinogen		
MOTION TEST	Before TMT Date:	After TMT Date:
Ova		
Cyst		
Occult blood		

AFB:

Radiological investigation- Chest X-ray PA View:

ECG :

Date :

Station:

Signature of the Investigator:

Signature of the Lecturer:

Signature of the HOD

தேசிய சித்த மருத்துவ நிறுவனம்

அயோத்திதாஸர் பண்டிதர் மருத்துவமனை,சென்னை-47

பட்டமேற்படிப்பு மருத்துவத்துறை

IV A- ஒப்புதல் படிவம்

ஆய்வாளரால் சான்றளிக்கப்பட்டது

நான் இந்த ஆய்வை குறித்த அனைத்து விபரங்களையும் நோயாளிக்கு புரியும் வகையில் எடுத்துரைத்தேன் என உறுதியளிக்கிறேன்.

தேதி : **கையொப்பம்:**

இடம்: **பெயர் :**

நோயாளியின் ஒப்புதல்

என்னிடம் இந்த மருத்துவ ஆய்வின் காரணத்தையும், மருந்தின் தன்மை மற்றும் மருத்துவ வழிமுறைப் பற்றியும், தொடர்ந்து எனது உடல் இயக்கத்தை கண்காணிக்கவும், அதனை பாதுகாக்கவும் பயன்படும் மருத்துவ ஆய்வுக்கூட பரிசோதனைகள் பற்றி திருப்தி அளிக்கும் வகையில் ஆய்வு மருத்துவரால் விள்க்கிக் கூறப்பட்டது.

நான் இந்த மருத்துவ ஆய்வின் போது, காரணம் எதுவும் கூறாமல், எப்பொழுது வேண்டுமானாலும் இந்த ஆய்விலிருந்து என்னை விடுவித்து கொள்ளும் உரிமையை தெரிந்திருக்கின்றேன்.

நான் என்னுடைய சுதந்திரமாக தேர்வு செய்யும் உரிமையைக் கொண்டு **சுவாச காசம்** நோய்க்கான **தூதுவளையாதிச் சூரணம்** மருந்தின் பரிகரிப்புத் திறனைக் கண்டறியும் மருத்துவ ஆய்விற்கு என்னை உட்படுத்த ஒப்புதல் அளிக்கிறேன்.

தேதி: **கையொப்பம்:**

இடம்: **பெயர் :**

தேதி: **சாட்சிக்காரர் கையொப்பம்:**

இடம்: **பெயர் :**

NATIONAL INSTITUTE OF SIDDHA, CHENNAI -47

AYOTHIDASS PANDITHAR HOSPITAL

DEPARTMENT OF MARUTHUVAM

PRECLINICAL AND CLINICAL STUDY ON *SWASA KASAM* (BRONCHIAL ASTHMA) AND DRUG OF CHOICE IS *"THUTHUVALAYATHY CHOORANAM " (INTERNAL) .*

FORM IV A - CONSENT FORM

Certificate by Investigator

I certify that I have disclosed all details about the study in the terms readily understood by the patient.

Date: Signature:

Name:

Consent by Patient

I have been informed to my satisfaction, by the attending physician, the purpose of the clinical trial, and the nature of drug treatment and follow-up including the laboratory investigations to be performed to monitor and safeguard my body functions.

I am aware of my right to opt out of the trial at any time during the course of the trial without having to give the reasons for doing so.

I, exercising my free power of choice, hereby give my consent to be included .As a subject in the clinical trial of **Thuthuvalayathychooranam** for the management of **Swasakasam** (Bronchial Asthma)

Date: Patient Signature:

Patient Name:

Date: Signature of Witness:

Name:

Relationship:

NATIONAL INSTITUTE OF SIDDHA, CHENNAI – 47

AYOTHIDASAR PANDITHAR HOSPITAL

DEPARTMENT OF MARUTHUVAM

PRE CLINICAL AND CLINICAL STUDY ON "SWASAKASAM"(BRONICAL ASTHMA) AND THE DRUG OF CHOICE IS "THUTHUVALAYATHY CHOORANAM" (INTERNAL)

FORM IV – INFORMATION SHEET

Name of the Principal Investigator: Dr.G.BANU

Name of the Institution : National Institute of Siddha

Tambaram Sanatorium

Chennai-47.

- I am, Dr.G.Banu studying M.D(S) in National Institute of Siddha, Chennai. Bronchial asthma is the common chronic inflammatory disease of the airway characterized by variable and recurring symptoms of wheezing ,coughing, chest tightness and shortness of breath . This condition is being treated is NIS with many siddha formulations. As a part of M.D(S) research programme and developing new efficacious medicine,we propose to study the **Thuthuvalayathy chooranam** formulation for treating the condition. This formulation has been mentioned in siddha literature and empirical evidence with contemporary tools is required for documentation. You can receive medicines free of cost. The duration of treatment period is 24days. You have to visit NIS every week and collect drugs for 7 days. The diagnosis tests will be carried out free of cost. We will assess the effect of treatment after completion of 24days of treatment using clinical and lab parameters.
- In this regard, we need to ask you few questions. We will maintain confidentiality of your comments and data obtained from you. There will be no risk of disclosing your identity and no physical, psychological or professional risk is involved by taking part in this study.
- Taking part in this study is voluntary. No compensation will be paid to you for taking part in this study. You can choose not to answer any specific question. There is no specific benefit for you if you take part in the study, but you will be under our clinical monitoring and specific attention will be given for your health. Taking part in the study may be of benefit to the community, as it may help us to develop medicine for swasakasam. In case of any adverse symptoms during the treatment which is expected for few patients during the treatment, shall be reported to PIs and care will be taken in NIS for relief. You can withdraw from the study at the midst of treatment period, if you are not interested to continue and you will receive our usual treatment without condition.
- The information we will collect in this study, will remain between you and the principal investigator. We will ask you a few questions through questionnaire. We will not write your name on different forms which sent to different investigating/analysis sections and we will use a code instead given by the principal investigator. Only the principal investigator will know the key to this code which will be kept in safe custody. If you agree to be a participant in this study, you will be screened as per the study protocol.
- If you wish to find out more about this study before taking part, you can ask me all the questions you want or contact Dr.G.Banu, M.D(S) scholar cum principal investigator of this study, attached to the National Institute of Siddha, Chennai (Mobile phone no:9962494255). You can also contact the Chairman/Member-secretary of Ethics committee, National Institute of Siddha, Chennai – 600047, Tel no: 91-44-22411611, for rights and participation in the study.

தேசிய சித்த மருத்துவ நிறுவனம், சென்னை 47

அயோத்திதாசர் பண்டிதர் மருத்துவமனை

சுவாசகாசம் நோய்க்கான சித்த மருந்தின் (தூதுவளையாதி சூரணம்) பரிகரிப்புத் திறனைக் கண்டறியும் மருத்துவ ஆய்விற்கான தகவல் படிவம்.

FORM IV தகவல் படிவம்

முதன்மை ஆராய்ச்சியாளர் பெயர் : Dr. கோ. பானு

நிறுவனத்தின் பெயர் : தேசிய சித்த மருத்துவ நிறுவனம்

தாம்பரம் சானட்டோரியம்

சென்னை 47

Dr. கோ. பானு ஆகிய நான் தேசிய சித்த மருத்துவமனையில் பட்ட மேற்படிப்பு பயின்று வருகிறேன். சுவாசகாசம் என்னும் நோயானது மூக்கில் வெளியாகும் காற்று அனல் வீசுவது போலத் தோன்றி,தொண்டை கட்டி,மூச்சு,மார்பில் கோழைகட்டி இருமலெழும் நோய். இந்நோய்க்கு தேசிய சித்த மருத்துவமனையில் பல சித்த மருந்துகள் பயன்படுத்தப்பட்டு வருகின்றது. சித்த மருத்துவ பட்ட மேற்படிப்பில், ஆய்வின் ஒரு பகுதியாக புதிய மருந்துகளை பயன்படுத்தும் நோக்கில் இந்நோய்க்கு தூதுவளையாதி சூரணம் வழங்க பரிந்துரை செய்கிறோம். இந்த மருந்தின் செய்முறை, அளவு, அனுபானம் மற்றும் மருத்துவ பயன்கள் அனைத்தும் அங்கீகரிக்கப்பட்ட சித்த மருத்துவ நூலில் கூறப்பட்டுள்ளது. எந்தவித கட்டணமுமின்றி தாங்கள் இந்த மருந்தினை பெற்றுக்கொள்ளலாம். இந்த ஆய்வில் மருந்து உட்கொள்ளும் காலம் 24நாட்கள் ஆகும். வாரம் ஒருமுறை தேசிய சித்த மருத்துவமனைக்கு நேரில் வந்து 7நாட்களுக்கான மருந்தினை பெற்றுக்கொள்ள வேண்டும். இந்த ஆய்வு சம்பந்தமான ஆய்வக பரிசோதனைகள் கட்டணமின்றி செய்யப்படும். 24 நாட்கள் மருந்து உட்கொள்ளும் காலம் முடிந்த பிறகு நோய்க்கான குறிகுணங்கள் மற்றும் ஆய்வக பரிசோதனைகள் இவற்றின் முடிவுகளின் அடிப்படையில் மருந்தின் பரிகரிப்புத்திறன் கண்டறியப்படும்.

இந்த ஆய்வு சம்பந்தமாக சில கேள்விகளை தங்களிடம் கேட்க இருக்கிறேன். தங்களிடமிருந்து பெறப்படும் கருத்துக்கள் மற்றும் குறிப்புகள் அனைத்தும் நம்பிக்கையாக பதிவு செய்யப்படும்.இந்த ஆய்வில் தங்களை உட்படுத்திக்கொள்வதின் மூலம் எந்த வகையிலும் பாதிப்புக்குள்ளாக மாட்டீர்கள் என உறுதி அளிக்கிறேன்.

எந்தவித வற்புறுத்தலுமின்றி, இந்த ஆய்வில் பங்கேற்கவும், இந்த ஆய்வு சம்பந்தமாக கேட்கப்படும் கேள்விகளுக்கு பதில் கூறவும் தங்களுக்கு முழு சுதந்திரம் அளிக்கப்படுகிறது. இந்த ஆய்வில் பங்கேற்பதற்கு எந்த சன்மானமும் வழங்கப்படமாட்டாது. ஆனால், ஆய்வு முழுவதும் எனது மேற்பார்வையிலும், தங்கள் உடல்நலன் குறித்த தனி கவனத்திலும் ஆய்வு மேற்கொள்ளப்படும். சுவாசகாசம் நோய்க்கான புதிய மருந்தின் பரிகரிப்புத்திறனை சமூகத்திற்கு உணர்த்தும் வகையில் இந்த ஆய்வு மேற்கொள்ளப்படுகிறது. இந்த ஆய்வில், மருந்து உட்கொள்ளும் காலத்தில் சிலருக்கு மாறுபட்ட குறிகுணங்கள் தொடர்ந்து இருக்கும் பட்சத்தில், முதன்மை ஆராய்ச்சியாளரான என்னிடம் தெரிவிக்கப்பட்டு, தேசிய சித்த மருத்துவமனையில் அதற்க்கான தீர்வு வழங்கப்படும். இந்த ஆய்வினைத் தொடர தங்களுக்கு விருப்பம் இல்லையெனில், எப்பொழுது வேண்டுமானலும் ஆய்வின் இடையில் விலகிக்கொள்ளவும், மருத்துவமனையில் வழங்கப்படும் இந்நோய்க்கான வழக்கமான மருந்துகளை பெற்றுக்கொள்ளவும் அறிவுறுத்தப்படுகிறீர்கள்.

இந்த ஆய்வில் சேகரிக்கப்படும் விபரங்கள் அனைத்தும் தங்களுக்கும் முதன்மை ஆராய்ச்சியாளரான எனக்கும் இடையில் இரகசியமாக வைக்கப்படும். கேள்வி பதில் வடிவத்தில் தங்களிடம் கேள்விகள் கேட்கப்படும். அனைத்துப் படிவங்களிலும் தங்களின் பெயர் தவிர்க்கப்பட்டு ஆய்வாளரால் தங்களுக்கென தனிக் குறியீடு வழங்கப்படும். அந்தக் குறியீடு ஆய்வாளருக்கு மட்டுமே தெரிந்ததாக இருக்கும். நீங்கள் இந்த ஆய்வில் பங்கேற்க விருப்பப்பட்டால், திட்ட வரைவு படி தேர்வு செய்யப்படுவீர்கள்.

நீங்கள் இந்த ஆய்வில் பங்கேற்கும் முன், இந்த ஆய்வினைப் பற்றிய மேலும் விபரங்கள் பெற வேண்டுமென விருப்பப்பட்டால், இந்த ஆய்வின் முதன்மை ஆராய்ச்சியாளர் மற்றும் தேசிய சித்த மருத்துவமனை, பட்ட மேற்படிப்புத்துறை மாணவர் Dr. கோ. பானு ஆகிய என்னை 9962494255என்ற எண்ணில் தொடர்பு கொள்ளலாம். மேலும், நீங்கள் இந்த ஆய்வில், உங்களது பங்கேற்பு மற்றும் உரிமை பற்றி தெரிந்து கொள்ள தேசிய சித்த மருத்துவமனை, தலைவர்/செயற்க்குழு உறுப்பினர் அவர்களையும் 91-44-22411611 என்ற எண்ணில் தொடர்பு கொள்ளலாம்.

NATIONAL INSTITUTE OF SIDDHA
CHENNAI -47
DEPARTMENT OF MARUTHUVAM

PRECLINICAL AND CLINICAL STUDY ON *SWASA KASAM* (BRONCHIAL ASTHMA) AND DRUG OF CHOICE IS *"THUTHUVALAYATHY CHOORANAM " (INTERNAL)* .

REG NO: 32101201 /2011-13
FORM IV C – DRUG COMPLIANCE FORM

S. NO:
OPD/IPD NO :
NAME :

Name Of The Drugs : THUTHUVALAYATHY CHOORANAM (Internal)

Drug – THUTHUVALAYATHY CHOORANAM ;

	0th day	**8th day**	**15th day**	**25th day**
Drug Issued				

	8th day	**15th day**	**25th day**
Drug returned			

S.NO	DATE	DRUG TAKEN TIME					
		MORNING/TIME		AFTERNOON/TIME		EVENING/TIME	
Day 1							
Day 2							
Day 3							
Day 4							
Day 5							
Day 6							
Day 7							
Day 8							
Day 9							
Day 10							
Day 11							
Day 12							
Day 13							
Day 14							
Day 15							
Day 16							
Day 17							
Day 18							
Day 19							
Day 20							
Day 21							
Day 22							
Day 23							
Day 24							

Date :

Station:

Signature of the Investigator:

Signature of the Lecturer: **Signature of the HOD**

NATIONAL INSTITUTE OF SIDDHA
AYOTHIDASS PANDITHAR HOSPITAL

DEPARTMENT OF MARUTHUVAM

PRECLINICAL AND CLINICAL STUDY ON SWASA KASAM (BRONCHIAL ASTHMA) AND DRUG OF CHOICE IS "THUTHUVALAYATHY CHOORANAM " ***(INTERNAL)*** **.**

FORM IV D
DIET FORM

உணவுமுறை மற்றும் செய்கைகள்

சேர்க்க தகுந்தவை :

1. ஆவியில் வேகவைத்த பண்டங்கள் இட்லி, இடியாப்பம், புட்டு, ஆப்பம்.
2. முசுமுசுக்கை அடை, கல்யாணமுருங்கை அடை
3. மஞ்சள், மிளகுதூள் கலந்த பால்
4. சுக்கு, இஞ்சி சேர்ந்த காபி
5. நண்டு சூப், மிளகு ரசம், ஆட்டுகால் சூப்.
6. தூதுவளை துவையல்.

சேர்க்க கூடாதவை :

1. குளிர்ச்சையான உணவு வகைகளான குளிர்பானங்கள், சாக்லெட், கேக்,
2. எண்ணெய் பதார்த்தங்கள்
3. தயிர், மோர், நெய்,பாலாடை,வெண்ணை.
4. கருவாடு,மாட்டிறைச்சி,கோழிக்கறி.
5. இனிப்பு, புளிப்பு சேர்ந்த உணவுகள்
6. கிழங்கு வகைகள்
7. பதப்படுத்தப்பட்ட உணவுகள்
8. ஒவ்வாத உணவுகள்
9. நீர் காய்றிகள்

செய்ய கூடாதவை :

1. புகைபிடித்தல், புகையிலை நீக்கவும்
2. குளிர்ந்த காற்றில் ஈடுபடுதல் தவிர்க்கவும்
3. தூசு, குப்பை நிறைந்த இடத்தில் இருப்பதை தவிர்க்கவும்
4. மனவுளைச்சல் கோபம் குறைக்கவும்
5. பிரணாயாமம் செய்யவும்.
6. இரவு உணவை மாலை 7 மணி க்கு சாப்பிடவும்.
7. இரவில் வயிறு முழுமையாக சாப்பிடுவதை தவிர்க்கவும்
8. கொதிக்கவைத்தாறிய நீர் பருகவும்.

AYOTHIDASS PANDITHAR HOSPITAL
DEPARTMENT OF MARUTHUVAM

PRECLINICAL AND CLINICAL STUDY ON *SWASA KASAM* (BRONCHIAL ASTHMA) AND DRUG OF CHOICE IS *"THUTHUVALAYATHY CHOORANAM " (INTERNAL)* .

FORM IV D

1.Do's

1. Steamed food like idly,idiyappam,puttu.
2. Mussumusukai adai,kalyanam murungai ada.
3. Turmeric and Peper mixed milk
4. Ginger,Dry ginger mixed cof fe
5. Crap soup,veg.soup, Peper rasam,mutton leg soup.
6. Thuthuvalai thuvayal.

2. Don't

1. Avoid cooldrinks,chocolate,cake.
2. Oily substance
3. Curd,gee,butter,cheese,
4. Dry fish,chicken,beaf,
5. Sweets,sour food,
6. Tuberous food,
7. Tined food,
8. Allergen food
9. Vegetables like cucumber,snake guard etc..
10. Citrus fruits

3.General advise

1. Avoid smoking,tobacco , alcohol,
2. Avoid Cold weather
3. Avoid,pollutated area,dust.,
4. Avoid Stress,
5. Do pranayamam,
6. Have your night food before 7'o clock,
7. Don't have full stomach at night .
8. Intake of hot water and hot food.

NATIONAL INSTITUTE OF SIDDHA
CHENNAI -47
DEPARTMENT OF MARUTHUVAM

PRECLINICAL AND CLINICAL STUDY ON SWASA KASAM (BRONCHIAL ASTHMA) AND DRUG OF CHOICE IS "THUTHUVALAYATHY CHOORANAM *" (INTERNAL)* .

REG N O: 32101201/2012-2013
FORM IV -E (WITHDRAWAL FORM)

Serial No: OPD/ IPD NO:

Name : Age: GENDER: M/F

Date of trial commencement:

Date of withdrawal from the trial:

Reason(s) for withdrawal;

1. Long absence at reporting: Yes/No

2. Irregular treatment: Yes/No

3. Shift of locality: Yes/No

4. Complication/Adverse reactions if any: Yes/No

5. Poor patient compliance: Yes/No

Date :

Station:

Signature of the Investigator:

Signature of the Lecturer:

Signature of the HOD

NATIONAL INSTITUTE OF SIDDHA
CHENNAI -47
DEPARTMENT OF MARUTHUVAM
REG NO:32101201/2012-13
FORM –IV F
ADVERSE REACTION FORM

PRECLINICAL AND CLINICAL STUDY ON SWASA KASAM (BRONCHIAL ASTHMA) AND DRUG OF CHOICE IS "THUTHUVALAYATHY CHOORANAM *" (INTERNAL)* .

Reg No:32101201/2012-13

Serial No: OP/IP No:

Name: Age: Gender: M/F

Date of trial commencement:

Date of the adverse reaction occur;

Time: Description of Adverse reaction:

Date:
Station:

Signature of the Investigator:

Signature of the Lecturer: **Signature of the HOD**

NATIONAL INSTITUTE OF SIDDHA
(An Autonomous Body under Department of AYUSH)
Ministry Of Health & Family Welfare, Government of India

Tambaram Sanatorium, Chennai - 600 047
Tel : 044-22411611 Fax : 044-22381314
E-mail : nischennaisiddha@yahoo.co.in
Website : www.nischennai.org

Name: Dr. BANU Reg. No: 32101201

Title: Pre-clinical & Clinical Study on SWASAKASAM (Bronchial Asthma) and the drug of choice is "THOTHUVALAYATHY CHOORANAM"

No. NIS/IEC/2011/3/01 – 24/12/2011

DECSION

Opinion of the Institutional Ethics Committee – Please Check one
✓ Approval _____ Modifications required prior to approval (Please specify one space below) _____ Disapproval Date of review: _____ Signed: _____ (Please print name) Dr.V.SUBRAMANIAN (Please delee as appropriate, Chairperson, Secretary)
Modifications needed Modification given to candidate
The research proponent is hereby informed that the Institutional Ethics Committee will require the following: 1. All adverse drug reactions (ADRs) that are both serious and unexpected to be reported promptly to the IEC within 7 working days 2. The progress report to be submitted to the IEC atleast annually 3. Upon completion of the study, a final study status report needs to submitted to the IEC

K. Manickavasakam
(Dr. K. MANICKAVASAKAM)
Member Secretary

Chairperson

NO'. 1248/ac/09/CPCSEA/4-01/2011

20/12/2011

20/12/2011

CERTIFICATE

This is certify that the project title. Pre Clinical and Clinical Study on Swasakasam (BRONCHIAL ASTHMA) and the drug of choice is Thuthuvalayathi chooranam. **has been approved by the IAEC.**

Prof. Dr. K. Manickavasakam
Name of Chairman/Member Secretary IAEC:

Dr. B. Jayachandran Dass
Name of CPCSEA nominee:

Signature with date

Chairman/Member Secretary of IAEC:

CPCSEA nominee:

(Kindly make sure that minutes of the meeting duly signed by all the participants are maintained by Office)

சித்த மருத்துவ மைய ஆராய்ச்சி நிலையம், அரும்பாக்கம், சென்னை - 600 106
सिध्द केन्द्रीय अनुसंधान संस्थान, अरुम्बाक्कम, चेन्नई- 600106
Siddha Central Research Institute
Arignar Anna Govt. Hospital Campus, Arumbakkam, Chennai-600 106
(Central Council for Research in Siddha, Department of AYUSH,
Ministry of Health & Family Welfare, Govt. of India)
Phone: 044-2621 49 25
Tele Fax: 044 26214809.
E-mail: crsiddha@gmail.com
Web: www.crsiddha.tn.nic.in

06.02.2012

CERTIFICATE

Certified that the minerals submitted for identification by Dr.G.Banu, II year Maruthuvam, National Institute of Siddha, Tambaram Sanatorium, Chennai-47 are identified as Indhupu – Sodium Chloride, Venkaram-Borax.

(R.Shakila)
Research Officer (Chemistry)

(K.Meenakshi Sundara Moorthy)
Asst. Director- In charge

NATIONAL INSTITUTE OF SIDDHA, CHENNAI – 600047

CERTIFICATE OF BOTANICAL AUTHENTICITY

Certified that the following plant drugs used in the Siddha formulation **Thuthuvalayathy Chooranam** (Internal) for the treatment of **Swasa Kasam** (Bronchial Asthma) taken up for Post Graduation Dissertation studies by **Dr.G.Banu**, M.D.(S), II year Department of Maruthuvam, 2011-12, are identified and authenticated through Visual inspection / Organoleptic characters / Experience, Education & Training/ Morphology / Micromorphology / Microscopical/ Taxonomical methods.

Solanum trilobatum Linn. (Solanaceae), Root
Aristolochia indica Linn. (Aristolochiaceae), Root
Terminalia chebula Retz. (Combretaceae), Fruit
Alpinia officinarum Hance (Zingiberaceae), Rhizome
Zingiber officinale Rosc. (Zingiberaceae), Rhizome
Nigella sativa Linn. (Ranunculaceae), Seed
Piper nigrum Linn. (Piperaceae), Fruit
Piper longum Linn. (Piperaceae), Fruit
Piper longum Linn. (Piperaceae), Root
Madhuca longifolia(Linn.) Macbride. (Sapotaceae), Oil cake
Ferula foetida Regel. (Apiaceae), Gum-oleoresin

MEDICINAL BOTANY * CHENNAI 600 047 * National Institute of Siddha

Certificate No: NIS/MB/40/2012

Date: 20-3-12

20/3/12

Authorized Signatory
Dr. D. ARAVIND, M.D.(s),M.Sc.,
Assistant Professor
Department of Medicinal Botany
National Institute of Siddha
Chennai - 600 047, INDIA

SOPHISTICATED ANALYTICAL INSTRUMENT FACILITY
INDIAN INSTITUTE OF TECHNOLOGY, MADRAS
Chennai - 600 036. INDIA

CERTIFICATE

Certified that herbal drug **THUTHUVALAYATHY CHOORANAM** formulated by **Dr.G.BANU** III Year M.D(S) Department of Maruthuvam, National Institute of Siddha , Tambaram Sanatorium was analysed (quantitative) by ICP-OES, HR-SEM and Physico chemical Analysis Methods at SAIF, IITM, Chennai-600 036, during October 2012.

Dr. R. MURUGESAN
Scientific Officer Gr.-I
Sophisticated Analytical Instrument Facility
Indian Institute of Technology, Madras
Chennai-600 036

Phone : 91-44-2257 4935 Fax : 91-44-2257 0545, 2257 0509
e-mail : saif@iitm.ac.in http://www.saif.iitm.ac.in

The Tamil Nadu Dr. M.G.R. Medical University

69, Anna Salai, Guindy, Chennai-600 032

This Certificate is awarded to ~~Mr/Ms~~/Dr. G.BANU

for participating as a ~~Resource Person~~ / Delegate in the VII Workshop

on "Research Methodology & Biostatistics"

for AYUSH Post-Graduates & Researchers

organized by the Department of Siddha

The Tamil Nadu Dr. M.G.R. Medical University

from 6th Feb. 2012 to 10th Feb. 2012.

DR. MAYILVAHANAN NATARAJAN
M.S.Orth. M.Ch.Orth. (L'pool) Ph.D. (Orth. Onco.) F.R.C.S. (Eng) D.Sc.
7th VICE CHANCELLOR

Dr. R. SRILAKSHMI, DCH, Ph.D.
REGISTRAR

Dr. N. KABILAN, M.D. (Siddha)
READER, DEPT. OF SIDDHA

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38. Web sites used to extract the important information to prepare this document
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OP/ IP After Treatment																						
Slno	Ip/OP	Age/ Sex	Hb	TC	DC			ESR		TRBC	Sugar		Urea	Creatine	Cholesterol					AFB	X-RAY	PERF
					P	L	E	1/2 Hr	1 Hr		F	PP			Total	HDL	LDL	VLDL	TGL			
1	C80516	40/F	11.4	7800	75	20	3	2	4	4	109	124	27	0.7	168	35	99	34	142	Normal	Normal	180
2	C80591	20/F	11.9	8200	60	37	2	2	6	6	80	102	21	0.6	176	26	121	29	123	Normal	Normal	250
3	C79343	21/F	11.2	8000	62	33	4	4	8	16	80	98	15	0.6	192	33	132	27	139	Normal	Normal	190
4	C80968	25/F	12.5	7900	63	35	2	2	4	12	84	98	18	0.6	176	36	112	28	103	Normal	Normal	280
5	C83148	29/F	11.6	7800	67	31	2	4	12	12	78	96	18	0.6	133	44	71	17	46	Normal	Normal	260
6	C83357	29/F	10.9	7400	59	36	2	6	14	4	86	111	20	0.6	191	48	103	40	107	Normal	Normal	320
7	C83859	21/F	12.2	8600	62	34	6	2	6	8	100	123	18	0.6	196	42	125	29	149	Normal	Normal	210
8	C84354	23/F	11.3	8000	66	31	2	4	2	24	66	90	26	0.7	176	41	116	19	93	Normal	Normal	280
9	C85576	34/F	10.8	9000	66	33	4	2	8	10	80	120	22	0.7	180	42	112	26	94	Normal	Normal	280
10	C85444	40/F	11.2	7000	64	32	3	4	6	16	75	96	15	0.6	174	41	114	19	64	Normal	Normal	290
11	C85401	28/F	10.2	8100	65	33	3	2	8	10	82	103	17	0.6	221	36	149	36	184	Normal	Normal	200
12	C87290	42/F	10.4	7200	56	43	1	2	4	8	67	89	15	0.6	159	47	96	16	81	Normal	Normal	180
13	C87563	52/F	12.5	7600	60	38	1	6	18	4	80	102	24	0.7	155	42	90	22	114	Normal	Normal	270
14	4077	33/F	10.8	8000	62	37	1	4	8	28	103	121	19	0.6	207	39	139	29	147	Normal	Normal	340
15	C89542	42/F	10.1	9300	63	35	2	4	6	16	100	124	15	0.6	235	33	168	40	168	Normal	Normal	290
16	C93882	44/F	11.7	8700	63	35	1	2	8	4	63	87	20	0.7	154	37	83	34	154	Normal	Normal	240
17	C88940	33/F	11.1	7200	52	47	1	2	4	12	85	111	18	0.6	180	50	100	30	150	Normal	Normal	250
18	C91895	18/F	10.9	8000	62	37	5	2	4	8	80	98	22	0.7	134	32	87	15	71	Normal	Normal	290
19	4043	35/F	10.9	8700	65	33	1	4	6	12	70	92	21	0.6	200	33	148	19	95	Normal	Normal	360
20	C87827	32/F	10.6	7800	70	27	2	2	8	12	76	102	17	0.6	162	28	110	24	98	Normal	Normal	290

Slno	Ip/OP	Age/ Sex	Hb	TC	DC			ESR		TRBC	Sugar		Urea	Creatine	Cholesterol					AFB	X-RAY	PERF
					P	L	E	1/2 Hr	1 Hr		F	PP			Total	HDL	LDL	VLDL	TGL			
21	4254	47/F	12.9	8800	63	35	2	2	4	4	82	113	20	0.6	148	40	86	22	121	Normal	Normal	310
22	4147	46/F	11.8	7100	58	39	3	2	8	12	56	77	15	0.6	179	31	129	19	91	Normal	Normal	360
23	D001578	32/F	10.5	5600	63	34	2	8	16	10	80	94	18	67	140	22	90	28	116	Normal	Normal	280
24	4206	55/F	11.5	8200	63	35	3	4	6	8	81	99	16	0.6	124	25	87	22	101	Normal	Normal	230
25	4202	31/F	11.4	7300	65	33	6	8	22	12	56	88	16	0.6	184	33	127	24	123	Normal	Normal	280
26	4205	40/F	11.2	8000	66	30	3	6	10	8	87	99	17	0.6	164	30	114	20	83	Normal	Normal	320
27	4983	29/M	13.4	8000	69	29	6	2	6	4	80	94	19	0.6	183	38	130	15	62	Normal	Normal	360
28	C84952	46/M	13.3	7800	72	27	5	2	6	4	70	95	17	0.6	127	32	75	20	49	Normal	Normal	380
29	C86528	38/M	14.2	7000	64	34	2	2	4	4	85	100	25	0.6	188	44	118	26	103	Normal	Normal	410
30	C87412	40/M	14.4	8900	64	31	3	2	6	4	77	92	23	0.7	177	40	114	23	126	Normal	Normal	360
31	C89103	55/M	13.3	8100	67	31	2	2	6	8	70	91	22	0.6	162	32	105	25	114	Normal	Normal	260
32	C92628	32/M	12.6	8200	62	36	4	2	4	20	71	87	16	0.6	174	20	131	23	115	Normal	Normal	310
33	C90031	25/M	12.9	7200	59	36	3	2	4	4	84	110	17	0.6	156	50	89	17	62	Normal	Normal	420
34	C90298	30/M	15.1	8200	64	34	3	2	4	4	74	94	21	0.7	186	38	128	21	106	Normal	Normal	370
35	C92056	26/M	12.1	7400	61	35	3	2	4	4	82	121	19	0.6	152	31	85	36	142	Normal	Normal	350
36	C91493	28/M	11.8	7900	55	40	2	8	14	4	78	98	20	0.6	170	27	120	23	144	Normal	Normal	340
37	C94291	21/M	12	8800	66	32	4	2	4	4	75	99	15	0.6	160	31	107	22	102	Normal	Normal	340
38	B73595	43/M	11.8	8200	65	29	3	4	6	8	71	90	15	0.6	209	44	131	34	157	Normal	Normal	240
39	5120	54/M	14.5	8800	65	32	1	4	24	4	90	121	15	0.6	184	41	126	17	60	Normal	Normal	430
40	5184	37/M	13.4	7900	69	29	1	2	6	4	86	101	19	0.6	183	38	130	15	62	Normal	Normal	250

OP/IP AFTER TREATMENT																						
S.NO	OP/IP.NO	AGE/ Sex	BILIRUBIN			SGOT	SGPT		PROTEIN			CAL	PHOS	URIC ACID	URINE							MOTION	
			TOTAL	DIR	INDIR			ALKPHOS		ALB	GLOB				ALB	SUGAR	DEP	BS	BP	URO	OVA	CYST
1	C80516	40/F	0.4	0.4	0.4	22	25	139	7.6	4.9	2.7	9	3.5	2.6	NIL	NIL	2-4PUS	NIL	NIL	N	NIL	NIL
2	4983	29/M	0.6	0.3	0.3	19	16	159	8	4.5	3.5	10.3	3	3.8	NIL	NIL	1-2 PUS	NIL	NIL	N	NIL	NIL
3	C80591	20/F	0.6	0.4	0.2	26	17	162	7.2	3.7	3.5	10.5	3.2	3.6	NIL	NIL	1-2PUS	NIL	NIL	N	NIL	NIL
4	C79343	21/F	0.6	0.3	0.3	26	20	211	7.2	4.1	3.1	10.5	3.6	4	NIL	NIL	3-5 PUS	NIL	NIL	N	NIL	NIL
5	C80968	25/F	0.5	0.3	0.2	19	18	169	7.7	4	3.7	9.7	3.6	4.8	NIL	NIL	1-2 PUS	NIL	NIL	N	NIL	NIL
6	C84952	46/M	0.6	0.3	0.3	24	18	138	7.6	3.9	3.7	9.7	3.8	3.2	NIL	NIL	2-4 PUS	NIL	NIL	N	NIL	NIL
7	C83148	29/F	0.6	0.3	0.3	16	18	190	7.9	4.7	3.2	9.3	3	4.1	NIL	NIL	2.4 PUS	NIL	NIL	N	NIL	NIL
8	C83357	29/F	0.5	0.3	0.2	19	17	163	7.4	4.5	3.5	9.8	3.7	4.7	NIL	NIL	1-2 PUS	NIL	NIL	N	NIL	NIL
9	C83859	21/F	0.4	0.2	0.2	17	22	234	7.2	3.7	3.5	10.2	4.2	3.9	NIL	NIL	4-8 PUS	NIL	NIL	N	NIL	NIL
10	C84354	23/F	0.6	0.3	0.3	21	17	126	7	4	3	9.9	3.2	3.1	NIL	NIL	1-2 PUS	NIL	NIL	N	NIL	NIL
11	C86528	38/M	0.6	0.3	0.3	11	20	153	7.8	3.9	3.9	9.3	3.3	3	NIL	NIL	1-2 PUS	NIL	NIL	N	NIL	NIL
12	C85576	34/F	0.5	0.3	0.2	32	28	239	7.9	4.1	3.8	10.3	3.6	4	NIL	NIL	2-4 PUS	NIL	NIL	N	NIL	NIL
13	C85444	40/F	0.6	0.4	0.2	18	20	232	7	4	3	10	4.5	3	NIL	NIL	1-2 PUS	NIL	NIL	N	NIL	NIL
14	C85401	28/F	0.4	0.2	0.2	17	22	193	7	4.2	2.9	9.9	3.8	3.1	NIL	NIL	2-4 PUS	NIL	NIL	N	NIL	NIL
15	C87290	42/F	0.6	0.3	0.3	18	19	227	7.1	3.6	3.5	10.2	4.2	3.6	NIL	NIL	2-4PUS	NIL	NIL	N	NIL	NIL
16	C87563	52/F	0.5	0.3	0.2	16	22	141	8	4.6	3.4	9.6	3.5	3.7	NIL	NIL	2-4 PUS	NIL	NIL	N	NIL	NIL
17	C87412	40/M	0.6	0.4	0.2	26	20	186	7.8	4.4	3.4	9.8	3.5	3.2	NIL	NIL	1-3 PUS	NIL	NIL	N	NIL	NIL
18	C89103	55/M	0.7	0.4	0.3	22	26	152	7.5	4.5	3	9.9	3.7	3.3	NIL	NIL	4-5 PUS	NIL	NIL	N	NIL	NIL
19	4077	33/F	0.6	0.3	0.3	16	20	184	7.6	4.5	3.1	10.3	4.5	4	NIL	NIL	1-2 PUS	NIL	NIL	N	NIL	NIL
20	C89542	42/F	0.6	0.4	0.2	16	19	182	7.3	3.9	3.4	10.1	4.1	2.6	NIL	NIL	1-2PUS	NIL	NIL	N	NIL	NIL
21	C93882	44/F	0.7	0.4	0.3	28	27	264	6.6	4.4	2	10.5	4.2	2.7	NIL	NIL	1-2 PUS	NIL	NIL	N	NIL	NIL
22	C88940	33/F	0.7	0.4	0.3	23	14	194	7.5	4.3	3.2	9.5	3.9	2.7	NIL	NIL	2-4PUS	NIL	NIL	N	NIL	NIL
23	C91895	18/F	0.6	0.4	0.2	23	19	134	7	3.8	3.2	10.3	4.2	2.9	NIL	NIL	2-3 PUS	NIL	NIL	N	NIL	NIL
24	C92628	32/M	0.6	0.3	0.3	22	18	169	7.2	4.2	3	10.3	4.2	3.8	NIL	NIL	1-2 PUS	NIL	NIL	N	NIL	NIL
25	4043	35/F	0.5	0.3	0.2	20	19	111	7.8	4.8	3	9.7	3.2	3.2	NIL	NIL	2-4 PUS	NIL	NIL	N	NIL	NIL
26	C87827	32/F	0.7	0.4	0.3	18	21	102	7.2	3.8	3	9.8	3.7	3.2	NIL	NIL	2-4 PUS	NIL	NIL	N	NIL	NIL
27	C90031	25/M	0.7	0.4	0.3	31	25	169	7	3.9	3.1	10.3	4	4.1	NIL	NIL	2.3 PUS	NIL	NIL	N	NIL	NIL
28	C90298	30/M	0.6	0.3	0.3	16	17	142	7.2	4.2	3.3	9.2	3.2	3.3	NIL	NIL	2-4 PUS	NIL	NIL	N	NIL	NIL
29	C92056	26/M	0.7	0.4	0.3	24	21	112	7.8	4.3	3.5	9.6	3.5	3.6	NIL	NIL	1-3 PUS	NIL	NIL	N	NIL	NIL
30	C91493	28/M	0.5	0.3	0.2	23	20	136	7	4.2	2.8	11	3.1	3.9	NIL	NIL	2-4 PUS	NIL	NIL	N	NIL	NIL
31	C94291	21/M	0.7	0.4	0.3	19	22	185	7.4	4.2	3.2	9.8	4.1	3.3	NIL	NIL	2-4 PUS	NIL	NIL	N	NIL	NIL
32	B73595	43/M	0.5	0.3	0.2	29	23	273	8	4.6	3.4	9.7	3.4	3.3	NIL	NIL	1-2 PUS	NIL	NIL	N	NIL	NIL
33	4254	47/F	0.5	0.3	0.2	21	18	139	7.8	4.3	3.5	9.4	4.1	3.7	NIL	NIL	1-2 PUS	NIL	NIL	N	NIL	NIL
34	5120	54/M	0.7	0.4	0.3	29	31	127	7	4.3	2.7	10.3	4.3	4.1	NIL	NIL	1-2 PUS	NIL	NIL	N	NIL	NIL
35	4147	46/F	0.5	0.3	0.2	20	12	158	7.1	3.7	3.4	9.6	3.6	3.2	NIL	NIL	2-3PUS	NIL	NIL	N	NIL	NIL
36	D001578	32/F	0.7	0.4	0.3	23	13	147	7.2	4.4	3	9.7	3.3	4	NIL	NIL	0-1 PUS	NIL	NIL	N	NIL	NIL
37	4206	55/F	0.6	0.3	0.3	29	26	168	7.4	3.8	3.6	9.5	4	3.1	NIL	NIL	3-4 PUS	NIL	NIL	N	NIL	NIL
38	4202	31/F	0.6	0.3	0.3	23	14	136	7.3	4.3	3	9.9	3	4.3	NIL	NIL	1-2 PUS	NIL	NIL	N	NIL	NIL
39	4205	40/F	0.4	0.2	0.2	15	14	163	7.2	4.1	3.1	9.7	3.6	3.1	NIL	NIL	1-2 PUS	NIL	NIL	N	NIL	NIL
40	5184	37/M	0.7	0.4	0.3	31	25	169	7	3.9	3.1	10.3	4	4.1	NIL	NIL	2.3 PUS	NIL	NIL	N	NIL	NIL

OP/IP Before Treatment																						
Slno	Ip/OP	Age/ Sex	Hb	TC	DC			ESR		TRBC	Sugar		Urea	Creatine	Cholesterol					AFB	X-RAY	PERF
					P	L	E	1/2 Hr	1 Hr		F	PP			Total	HDL	LDL	VLDL	TGL			
1	C80516	40/F	11.6	8600	60	35	5	2	8	3.9	60	70	25	0.7	161	39	93	29	164	Negative	Normal	130
2	C80591	20/F	10.8	5900	61	37	6	4	10	3.5	83	95	19	0.6	166	36	96	34	172	Negative	Normal	120
3	C79343	21/F	10.3	6000	57	40	7	4	12	3.3	81	96	16	0.6	154	34	94	24	120	Negative	Normal	150
4	C80968	25/F	10.4	8600	66	30	7	4	10	3.4	78	94	17	0.6	205	48	133	24	123	Negative	Normal	130
5	C83148	29/F	10	7000	74	20	5	6	16	3.3	75	97	15	0.6	160	26	115	19	95	Negative	Normal	100
6	C83357	29/F	12.9	8700	62	35	5	10	24	4.3	80	101	22	0.6	158	50	88	20	102	Negative	Normal	180
7	C83859	21/F	11.6	7300	57	39	14	4	8	4.6	85	105	19	0.6	206	36	147	23	113	Negative	Normal	150
8	C84354	23/F	9.5	4600	53	40	4	8	6	3.5	85	95	18	0.7	143	25	90	28	140	Negative	Normal	160
9	C85576	34/F	10.8	8000	61	38	10	8	18	3.6	78	90	17	0.6	134	30	82	22	110	Negative	Normal	170
10	C85444	40/F	9.5	5700	64	30	8	6	8	3.9	80	98	22	0.7	165	30	114	21	109	Negative	Normal	160
11	C85401	28/F	11	6200	65	32	4	4	12	4	86	102	20	0.6	183	36	110	37	138	Negative	Normal	150
12	C87290	42/F	10.6	7800	65	30	5	2	6	4.1	78	90	15	0.6	158	27	114	17	85	Negative	Normal	110
13	C87563	52/F	11.6	8600	60	35	4	8	26	3.9	60	70	25	0.7	161	39	93	29	164	Negative	Normal	140
14	4077	33/F	10.8	5900	61	37	4	8	18	3.5	83	95	19	0.6	166	36	96	34	172	Negative	Normal	130
15	C89542	42/F	10.3	6000	57	40	5	6	14	3.3	81	96	16	0.6	154	34	94	24	120	Negative	Normal	180
16	C93882	44/F	10.4	8600	66	30	1	4	12	3.4	78	94	17	0.6	205	48	133	24	123	Negative	Normal	110
17	C88940	33/F	10	7000	74	20	3	4	10	3.3	75	97	15	0.6	160	26	115	19	95	Negative	Normal	160
18	C91895	18/F	12.9	8700	62	35	7	4	8	4.3	80	101	22	0.6	158	50	88	20	102	Negative	Normal	180
19	4043	35/F	11.6	7300	57	39	3	8	10	4.6	92	103	19	0.6	206	36	147	23	113	Negative	Normal	180
20	C87827	32/F	9.5	4600	53	40	4	4	12	3.5	85	95	18	0.7	143	25	90	28	140	Negative	Normal	190

Slno	Ip/OP	Age/ Sex	Hb	TC	DC			ESR		TRBC	Sugar		Urea	Creatine	Cholesterol					AFB	X-RAY	PERF
					P	L	E	1/2 Hr	1 Hr		F	PP			Total	HDL	LDL	VLDL	TGL			
21	4254	47/F	10.8	8000	61	38	4	4	10	3.6	83	98	17	0.6	134	30	82	22	110	Negative	Normal	160
22	4147	46/F	9.5	5700	64	30	10	2	12	3.9	80	98	22	0.7	165	30	114	21	109	Negative	Normal	190
23	D001578	32/F	11	6200	65	32	5	12	26	4	86	102	20	0.6	183	36	110	37	138	Negative	Normal	130
24	4206	55/F	10.6	7800	65	30	7	8	12	4.1	78	90	15	0.6	158	27	114	17	85	Negative	Normal	180
25	4202	31/F	11.6	8600	60	35	9	12	30	3.9	60	70	25	0.7	161	39	93	29	164	Negative	Normal	160
26	4205	40/F	10	7000	74	20	5	8	16	3.3	75	97	15	0.6	160	26	115	19	95	Negative	Normal	150
27	4983	29/M	11.1	6900	60	37	10	4	10	3.6	68	75	15	0.6	201	33	138	30	150	Negative	Normal	180
28	C84952	46/M	10	5000	54	39	6	6	10	3.3	84	88	22	0.6	132	34	82	16	80	Negative	Normal	210
29	C86528	38/M	15	7400	62	36	6	2	4	5	84	94	26	0.7	176	28	127	22	108	Negative	Normal	230
30	C87412	40/M	11.2	6800	65	25	8	4	8	3.9	80	112	24	0.6	142	31	73	38	149	Negative	Normal	210
31	C89103	55/M	11.8	8100	53	40	7	6	8	3.7	88	112	20	0.6	189	37	120	32	164	Negative	Normal	180
32	C92628	32/M	11.6	8900	65	31	9	4	8	3.8	79	97	17	0.6	161	32	107	22	112	Negative	Normal	160
33	C90031	25/M	10.8	8500	63	29	7	6	10	3.6	85	105	18	0.6	187	44	113	30	141	Negative	Normal	250
34	C90298	30/M	14.2	9800	65	31	6	2	6	4.7	78	96	23	0.6	239	39	169	31	155	Negative	Normal	210
35	C92056	26/M	11.1	6900	60	37	5	6	8	3.6	68	75	15	0.6	201	33	138	30	150	Negative	Normal	190
36	C91493	28/M	10	5000	54	39	5	10	24	3.3	84	88	22	0.6	132	34	82	16	80	Negative	Normal	210
37	C94291	21/M	15	7400	62	36	6	2	6	5	84	94	26	0.7	176	28	127	22	108	Negative	Normal	170
38	B73595	43/M	11.2	6800	65	25	5	6	8	3.9	80	112	24	0.6	142	31	73	38	149	Negative	Normal	210
39	5120	54/M	11.8	8100	53	40	6	8	30	3.7	88	112	20	0.6	189	37	120	32	164	Negative	Normal	230
40	5184	37/M	11.6	8900	65	31	3	2	8	3.8	79	97	17	0.6	161	32	107	22	112	Negative	Normal	220

OP/IP Before Treatment

S.NO	OP.NO	AGE/ Sex	BILIRUBIN			SGOT	SGPT	ALKP HOS	PROTEIN			CAL	PHOS	URIC ACID	URINE							MOTION	
			TOTA	DIR	INDIR				TOTA	ALB	GLOB				ALB	SUGA	DEP	BS	BP	URO		OVA	CYST
1	C80516	40/F	0.7	0.4	0.3	22	25	270	8	4.2	3.8	9	3.5	3.1	NIL	NIL	2-	NIL	NIL	N		NIL	NIL
2	4983	29/M	0.7	0.4	0.3	14	16	203	7.9	4.5	3.4	9.6	3	3.9	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
3	C80591	20/F	0.7	0.4	0.3	30	17	192	6.2	3.7	2.5	11.4	3.3	3.7	NIL	NIL	1-	NIL	NIL	N		NIL	NIL
4	C79343	21/F	0.7	0.4	0.3	20	17	201	6.8	3.8	3	10.7	3.5	4	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
5	C80968	25/F	0.7	0.4	0.3	9	18	195	7.7	4.2	3.5	9.3	3.4	4.9	NIL	NIL	1-2	NIL	NIL	N		NIL	NIL
6	C84952	46/M	0.6	0.3	0.3	29	32	141	7.8	4	3.5	8.7	4.2	6.7	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
7	C83148	29/F	0.6	0.4	0.2	20	29	214	7.3	4.3	3	8.6	3.9	4.8	NIL	NIL	1.3	NIL	NIL	N		NIL	NIL
8	C83357	29/F	0.6	0.3	0.3	20	22	144	7.5	4.6	3.5	9.9	4.3	4.8	NIL	NIL	0-1	NIL	NIL	N		NIL	NIL
9	C83859	21/F	0.9	0.5	0.4	24	21	295	7	3.4	3.6	9.9	3.5	3.9	NIL	NIL	5-10	NIL	NIL	N		NIL	NIL
10	C84354	23/F	0.7	0.4	0.3	29	24	204	6.6	3.8	3.2	10.3	4.4	3.7	NIL	NIL	1-2	NIL	NIL	N		NIL	NIL
11	C86528	38/M	0.6	0.3	0.3	27	26	343	8	4.2	3.8	8.7	4.5	3.8	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
12	C85576	34/F	0.7	0.4	0.3	23	17	116	6.8	3.8	3	10.1	3.6	3.4	NIL	NIL	1-2	NIL	NIL	N		NIL	NIL
13	C85444	40/F	0.7	0.4	0.3	48	50	286	8.3	4.3	4	10.9	3.4	4.6	NIL	NIL	1-2	NIL	NIL	N		NIL	NIL
14	C85401	28/F	0.6	0.3	0.3	18	20	237	8.5	4.3	4.2	9.8	4.2	4.3	NIL	NIL	3-4	NIL	NIL	N		NIL	NIL
15	C87290	42/F	0.6	0.3	0.3	21	19	193	7.1	4.1	3	9.9	3.6	3.8	NIL	NIL	3-5	NIL	NIL	N		NIL	NIL
16	C87563	52/F	0.5	0.3	0.2	16	17	217	7.5	3.6	3.9	9.3	3.5	6.2	NIL	NIL	1-	NIL	NIL	N		NIL	NIL
17	C87412	40/M	0.6	0.3	0.3	31	26	214	8	4.5	3.5	9.3	3.5	3.9	NIL	NIL	4-6	NIL	NIL	N		NIL	NIL
18	C89103	55/M	0.7	0.4	0.3	17	31	171	7.6	4.3	3.7	8.9	3.7	4.3	NIL	NIL	4-5	NIL	NIL	N		NIL	NIL
19	4077	33/F	0.5	0.3	0.2	26	28	171	7.8	4.3	3.5	8.7	3.9	4.7	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
20	C89542	42/F	0.7	0.4	0.3	14	22	270	7.8	4.7	3.1	9.5	3.6	4.1	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
21	C93882	44/F	0.5	0.3	0.2	27	26	184	7.2	3.8	3.4	8.8	4.1	4.2	NIL	NIL	1-	NIL	NIL	N		NIL	NIL
22	C88940	33/F	0.6	0.3	0.3	34	31	284	8.2	4.4	3.8	10.9	4	4.1	NIL	NIL	1-2	NIL	NIL	N		NIL	NIL
23	C91895	18/F	0.7	0.4	0.3	28	25	189	7.7	4	4	9.3	2.9	3.7	NIL	NIL	1-	NIL	NIL	N		NIL	NIL
24	C92628	32/M	0.7	0.4	0.3	21	18	201	7.9	4.6	3.3	10.5	4.4	5.9	NIL	NIL	1-2	NIL	NIL	N		NIL	NIL
25	4043	35/F	0.4	0.2	0.2	20	16	131	7.8	4.3	3.5	10.5	4.2	2.1	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
26	C87827	32/F	0.5	0.3	0.2	17	12	131	7.8	4.8	3	9.7	3.2	4.6	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
27	C90031	25/M	0.7	0.4	0.3	27	26	234	7.2	4.1	3.1	9.2	3.9	5.1	NIL	NIL	2.4	NIL	NIL	N		NIL	NIL
28	C90298	30/M	0.7	0.4	0.3	20	17	174	7.9	4.4	3.5	7.1	3.2	3.3	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
29	C92056	26/M	0.7	0.4	0.3	27	24	156	7.9	4.2	3.7	8.7	3.8	4.5	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
30	C91493	28/M	0.6	0.4	0.2	30	33	193	6.9	3.8	3.1	11.1	3.1	4.7	NIL	NIL	3-6	NIL	NIL	N		NIL	NIL
31	C94291	21/M	0.9	0.5	0.4	19	22	285	8.4	4.6	3.8	8.5	4.8	3.3	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
32	B73595	43/M	0.7	0.4	0.3	39	58	296	8.5	5.1	3.4	9.6	3.5	4.6	NIL	NIL	2-3	NIL	NIL	N		NIL	NIL
33	4254	47/F	0.8	0.5	0.3	15	21	109	7.4	3.8	3.2	8.8	3.7	4.6	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
34	5120	54/M	0.6	0.3	0.3	36	30	127	8.5	4.5	4	8.7	3.6	4.7	NIL	NIL	1-2	NIL	NIL	N		NIL	NIL
35	4147	46/F	0.4	0.2	0.2	21	17	139	8	3.1	4.9	8.7	3.8	4.6	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
36	D001578	32/F	0.5	0.3	0.2	20	19	178	7.1	3.7	3.4	9.3	4	3.9	NIL	NIL	2-	NIL	NIL	N		NIL	NIL
37	4206	55/F	0.8	0.5	0.4	23	13	181	7.9	4.8	3.1	9.1	3.3	4.3	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
38	4202	31/F	0.5	0.3	0.2	21	17	160	7.4	3.8	3.6	9.5	4.1	2.1	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
39	4205	40/F	0.5	0.3	0.2	26	28	171	7.8	4.3	3.5	8.7	3.9	4.7	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL
40	5184	37/M	0.7	0.4	0.3	20	17	174	7.9	4.4	3.5	7.1	3.2	3.3	NIL	NIL	2-4	NIL	NIL	N		NIL	NIL

DRUGS OF THUTHUVALAYATHY CHOORANAM

Thuthuvali root bark 	**Echechura muli root** 
Milagu 	**Thippili** 
Perungayam 	**Karunchirakam** 
Illuppai-oil cake 	**Kadukai** 

Kandathippili 	**Kadukkai** 
Chittarattai 	
Indhuppu 	**After purification** 
vengaraam 	**After purification**